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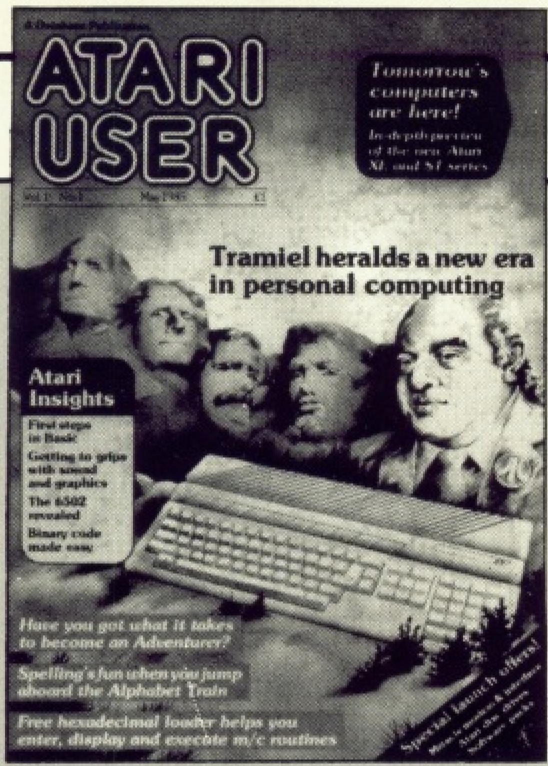
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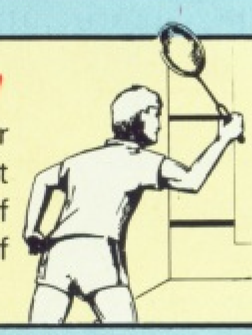
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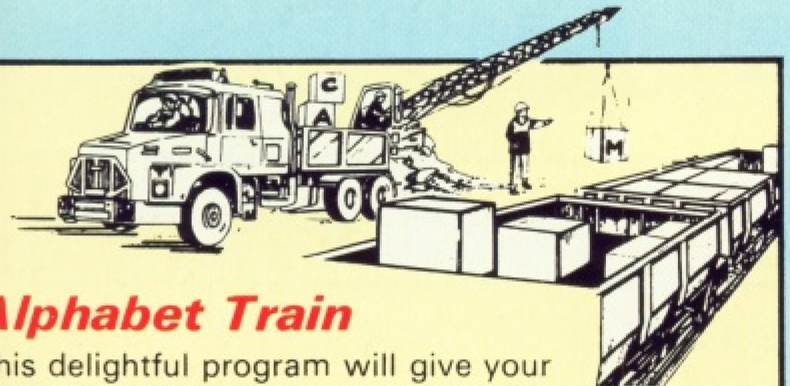
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Let's introduce ourselves . . .

WELCOME to the first edition of *Atari User* – the exciting new magazine for the whole range of Atari micros, written by Atari users for Atari users.

For years now we Atari aficionados have known that Atari's tremendous graphics and sound capabilities – plus the wide variety of add-ons and software – put them in a league of their own.

Now many more discerning micro users are waking up to this fact, and interest in Atari is soaring.

The latest Atari machines promise to totally dominate both the 8 bit and 16 bit fields. They are the most exciting microcomputer developments we've seen for a long time – as you'll gather from our previews. The tremendous interest shown in these new models can only benefit users of the established range of Atari micros.

Certainly, *Atari User* will be catering for all Atari machines, old and new. Each issue will be packed with informative features, full length listings, hints and tips, hardware and software reviews, and all the latest news from the ever expanding world of the Atari. Beginner or experienced user, you'll always find something of personal interest to you in our pages.

Don't forget, though, this is your magazine. We're always willing to listen to your suggestions, so let us know what you want to see in our pages.

And we're on the lookout for new writers, too. If you have an article or program that would interest us, please let us know.

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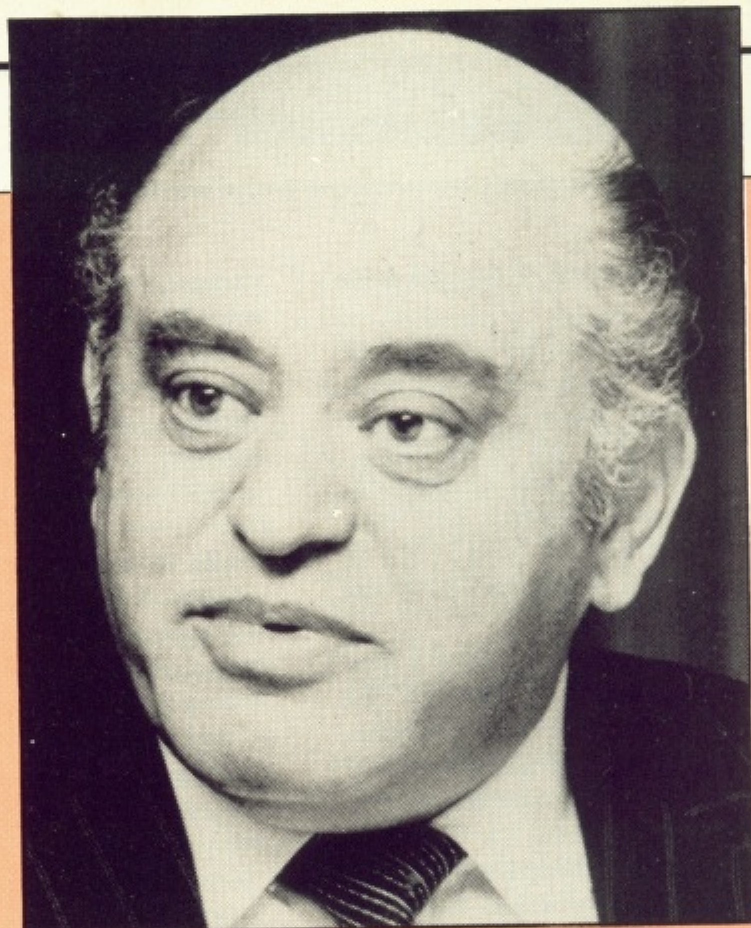
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The dramatic change in Atari's fortunes has been due to one man – Jack Tramiel. This human dynamo is the best-known figure in the world of personal computing – and the most outspoken. The ex-inmate of Auschwitz who created Commodore, built it into a computing giant, initiated vigorous price-cutting, and rescued Atari with $30 million of his own and a guarantee of an additional $45 million. The story of Tramiel and how he fought his way to the top – and intends to stay there – is told by

MIKE COWLEY

The Man... aiming for another billion

A FORMER Commodore employee who ran afoul of Jack Tramiel was asked whether or not his ex-boss would make a good President of the United States.

"The trouble with Jack", he replied, "is that while he certainly has the ability, he just isn't democratic enough. Although he likes to do things for the people, he wouldn't want to be answerable to them".

This may simply have been a case of sour grapes. After all Tramiel's footprint still showed on the seat of the executive's trousers. But even those closest to Jack readily admit that he sometimes comes across like a wounded elephant, trampling underfoot everyone and everything in his path.

And this is why the new boss of Atari has the reputation of being the most feared – yet at the same time most respected – personality in the computer industry today.

When Jack Tramiel is around, he isn't just a man. In the language of the ghetto, he's THE man – and you'd better believe it.

At the end of a corporate battle involving the head of the Tramiel clan it is said that he will not walk away until his victims' blood is splattered on the walls and the ceiling as well as the floor.

It is this ruthless approach – some would argue it's just good business – which enabled him to lead Commodore to become the first personal computer company to pass the magic $1 billion turnover milestone.

And now he intends to serve up the same for Atari, the company which he had previously helped to bring to its knees.

Not that Jack Tramiel is overly concerned with what people say about his methods. He only cares for being a winner – so that end result for him will always justify the means.

"I believe business is war", is one of the Atari chief's favourite sayings. No one who knows him doubts his word.

Once asked to comment on the high turnover of executives while he was at Commodore – the standing joke at the time was you get a gold watch if you lasted a year – he said: "Our generals are all in the trenches – so more of them get killed".

However when Jack Tramiel comes out on top he's not the only winner. For his entire business philosophy is based on the belief that the only way to make money is to give the customer true value.

"It is this more than anything else about Tramiel which bodes well for anyone who ever bought an Atari or is even thinking about buying one", an industry observer told me.

"With Jack you know he'll be in your corner fighting all the way. He's a street fighter from way back, and if he loses a few more executives than most along the way, he won't lose any sleep about it".

However those of his lieutenants who survive the rigours of the campaigns are richly rewarded for the absolute loyalty, supreme expertise and total commitment demanded.

More people at Commodore ended up millionaires in their own right than in any other high tech corporation in Silicon Valley. Bonus payments of up to 100 per cent of salary plus

substantial allocations of shares saw to that.

"There's a touch of the godfather about Jack", said yet another Commodore man whose name never made the corporate roll of honour.

"His generosity knows no bounds, but neither does his wrath. You may not end up wearing a concrete overcoat, but the message is much the same".

Bald and rotund, at 55 years of age Jack Tramiel could be mistaken for somebody's favourite uncle. In fact he would not seem out of place dishing out bagels and lox behind the counter of a delicatessen.

It's only those heavily hooded shrewd eyes which provide the clue that here is a man whose character has been forged on the anvil of adversity – a man to be reckoned with.

As benefits a former New York cabbie, it doesn't take long to figure out that doing business with him will mean paying full fare – and not getting any change.

Yet those people who expect Jack Tramiel to surround himself with sycophants would be way off mark. For he enjoys nothing more than confrontation – "the more, the better" – with members of his team.

Constantly punctuating his remarks by banging his fist on the desk top, he demands ever more from his hard pressed executives. And with him it is argument he seeks, not discussion.

The people he most likes to have around him are the brilliant mavericks who do not always follow the rules.

Jack Tramiel, you see, is not entirely sold on rules. For rules often become orders which must be obeyed. And these, in turn, have been known to become excuses for some of the worst excesses of human behaviour.

And the young Jack knew only too well about these. Born in Poland, he was provided with a "ticket to hell" at the age of 11 when a number was burned into his flesh on entering Auschwitz.

He managed to survive the war as a slave labourer working on road construction – "they had to feed us or we wouldn't have been able to work".

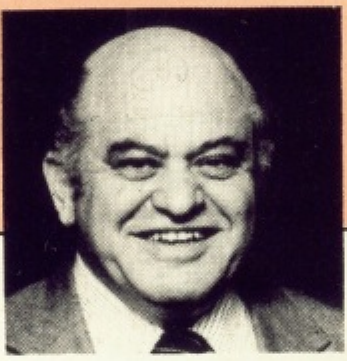
Somewhat surprisingly Jack Tramiel insists he does not hate either the Germans or Germany today. In fact he chose to build a factory there close to an autobahn on which he had worked.

Asked why he would provide employment for the people who persecuted his race, he answered simply: "I live in the future".

At the end of the war he moved to the United States, joined the army there and learned to repair typewriters. It was this skill which was to set him on the road to joining the ranks of North America's self-made immigrant millionaires.

His wasn't to be an overnight rags to riches story however.

Once he became a civilian again he used his newfound skill to launch his own typewriter business in the tough, teeming Bronx neighbourhood much loved as the backdrop for gangster films.



❛We make computers for the masses, not the classes❜

Always an opportunist, he became one of the first to realise the potential of electro-mechanical adding machines.

In the mid-fifties Jack Tramiel and his wife Helen headed north to Toronto to open Everest Office Machines.

Securing the rights to a line of Czechoslovakian typewriters made the fledgling company so successful that it went public in 1962. And so the Commodore Portable Typewriter Corporation was born.

Three years later it nearly collapsed when its major backer, C.P. Morgan, was found to have built his business empire on fraudulent loans. In the wake of the adverse publicity Commodore was unable to get credit.

It was only an appeal by Jack Tramiel to financier Irving Gould which resulted in the company being bailed out at the eleventh hour.

To persuade the money man to come up with the lifeline, Jack turned over all of his stock with the proviso that some of it – an undetermined amount – was to be returned once Commodore was back on its feet.

It was only a matter of months before Jack Tramiel found himself once more with a piece of the action. So he adjusted his corporate gum shield and came out of the Commodore corner fighting.

Steering the company into the lucrative but volatile calculator market, he suddenly found himself at war for the first time with the big boys.

Texas Instruments was to eventually win the ugly battle for the main American market, leaving Jack Tramiel bloodied but unbowed. For he had already conceived the idea which was to enable him to make a triumphant comeback – a cheap computer for the masses.

Having at one time briefly considered buying Apple, he opted out in favour of setting up his own development team. And such was the excitement generated when he eventually unveiled the Commodore Pet that customers fell over themselves to pay for it in full in advance – then wait six months for delivery.

It wasn't long after that he decided to invade Europe, a place for which he has always had a soft spot.

Jack Tramiel remains convinced that the Europeans are much more appreciative of value for money than their brash American cousins – and that is what he was offering.

With no real competition facing Commodore in Europe in the late 70s, he was soon able to capture 80 per cent of the market in the UK and Germany.

So with booming sales on both sides of the Atlantic, his much quoted saying "We make computers for the masses, not the classes", became a fact of life.

In fact it was during Commodore's heyday that Jack Tramiel earned himself the reputation of being the source of memorable phrases.

"Business is like sex", he once told an interviewer. "You have to be involved".

And when discussing the possible threat of the MSX machines, he was moved to utter: "The Japanese are

coming – so we will become the Japanese".

Yet it is his almost God-like commandment to Moses phrase – "It will be done" – which still echoes in the ears of his former colleagues.

When Jack Tramiel resigned from Commodore after an apparent disagreement with Gould, shock waves reverberated through the industry for months.

Now that Jack is back – this time at Atari – nothing much seems to have changed. Already members of his former Commodore clan – even some he unceremoniously dumped – have been clamouring to get back on board, such is the charisma of the man.

When Warner Communications relinquished control of Atari to Tramiel few tears were shed. After all, the company had lost $500 million in 1983. But the new boss is already forecasting billion dollar profits.

To achieve this he was soon seen to be resorting to his well proven methods. Within a month of taking over he had taken up the hatchet to reduce Atari's world wide staff from 5,000 to 1,500.

"Bodies were strewn everywhere", moaned one of the dear departed. And of the 40 buildings in the far flung Atari empire only seven still remain.

To ensure he maintains a permanent armlock on his new company, Jack Tramiel has placed his three sons in key executive positions.

Not that nepotism influenced this decision as Sam, Leonard and Gary are all time-proven executives in their own right. But their arrival has satisfied his Jewish desire for a close knit family unit. Yet his "family" is not simply restricted to blood relatives. For he looks on every member of the Tramiel "war cabinet" as part of his immediate household.

No one – and that includes himself – will ever be found flying first class on company business.

In essence this is a reflection of the private face of Jack Tramiel, the man who enjoys nothing better than being at home with his wife eating Polish "peasant" food.

But a very close second comes his enormous appetite for business.

Now that he is armed with his new ST range of computers, he exudes the confidence of the general who has just been provided with the world's first nuclear missiles.

And with his finger on the button, the Apples of this world had better watch out.

Future looks very, very rosy

By PHILIP MORRIS, Director, English Software

THE Atari computer is designed from the outset to be a complete personal computer, where virtually no extras are required to give you the facilities you want and need in a home computer.

For example, this article was written on an Atari 800XL 64k computer – whose keyboard is a joy to use – using Atariwriter, the excellent cartridge-based word processor program which even works on a 16k Atari using only cassette, if necessary, for data storage.

Many Atari owners are already aware of the chequered history of the company in the US, where the cut-throat competitive nature of the home computer market has seen the exit of Texas, Timex and Mattel from this battlefield over the last couple of years.

Now with Jack Tramiel's takeover of Atari, with his "business is war" philosophy, the company's expansion plans are based upon a distinct value-for-money policy where popular pricing rules the roost.

In Britain, unfortunately, Atari has always been regarded, purely in terms of computer sales, as less successful than other UK based companies, probably due to the old pricing policy where £300 to £600 was the Atari norm.

So the best home computer available lost out to the Spectrum, the Vic 20 and the Commodore 64. Sounds unbelievable doesn't it?

Anyway, the Lord works in mysterious ways, to quote a famous computer hacker, and the rest is now history.

Jack Tramiel moves in, takes over Atari, brings down prices in one or two fell swoops, making the best personal computer accessible to almost everybody.

OK, so Atari remains labelled with the games tag when, in fact, most home computers are used for entertainment anyway . . . rendering this label now pretty meaningless.

If you feel the need to use your computer for something other than games playing, and believe me, we all feel that need sometimes, then the Atari will help you compose music, design multi-colour graphic images, type letters (and articles) and much, much more.

This is the perfect place to encourage correspondence from readers who are using their Atari computers for applications that others might not have even dreamed of.

Let us now shatter some common myths – that for instance the Atari cannot reproduce digitised sampled sound in the same way the Commodore 64 can. Well, in fact, yes it can. Games and other programs should be on the market this year that do feature high quality speech as an integral part of their action. Just wait and see.

Also, with the growth in the market for disc drives, the British Atari owner will fully begin to appreciate the great advantages of owning a reliable fast-access disc drive – fast, easy loading, and much more versatile than cassette.

Of course technology never stands still for more than 10 microseconds and the new Atari ST range represents a major step forward for Atari.

The future may lie in Atari's hands still . . . so where does that leave you, the user?

Well, obviously the software companies will always provide an ample supply of exciting and interesting software, with more and more UK companies now starting to manufacture add-ons and peripherals in much the same way as they do for other computers . . . cheaper RAM packs, cassette recorder interfaces, printer interfaces, and so on.

The future for Atari looks very, very rosy indeed. Roll on 1986.

THE ANATOMY OF THE ST

BRYAN WILLIAMS finds out why the new Atari ST machines are about to set the micro marketplace on fire

THE excitement surrounding the Atari ST range has not been seen in the computer industry for a long time. So what is it that has set the micro market on fire?

At the heart of the machine is the powerful Motorola 68000 microprocessor, already the de facto standard in 16/32 bit CPUs. Running at 8mHz, power and speed combine to give remarkable performance.

The new keyboard features a full typewriter layout with the addition of a cursor control section, a numeric keypad and 10 special function keys.

With the ST, Atari users have a built-in choice of language. The machine features not only a new version of Atari Basic but also Logo, the language much favoured in education because of its ease of use.

For machine language programmers, the 68000 is the obvious choice for the new generation of machines feature not only a new addressing modes and five different data types.

The three graphics modes give a choice of resolution. The intense colour display uses 320 × 200 dots with 16 colours on screen. The high resolution colour display uses 640 × 200 dots with four colours. For really high resolution, the monochrome display offers a staggering 640 × 400 dot display.

Sound is also prominent on the ST's list of features. The sound generator has three separate voices, each with its own pitch and volume settings. Waveform shaping controls make the notes sound as if they were played on a real instrument.

Another first for the ST is its built-in Midi interface which allows it to control many synthesisers used by today's musicians.

There's also an RS232C serial port for modems and other serial devices and a Centronics parallel port suitable for dot matrix printers.

The ST can handle both floppy and hard discs. For floppies it has a built in port compatible with the 500k Sony 3½in drive. There's also a high speed hard disc interface with a data transfer rate of 1.3 mbytes per second.

Of course it wouldn't be an Atari without a joystick port, and the ST has two – one for the mouse which comes with the machine. With this, complicated keyboard instructions are a thing of the past. Simply use it to pull down a menu and select the item you want. If you've never used a mouse before, you'll be surprised at how much it simplifies your interaction with the machine. No more trying to remember whether it was Ctrl-K or Ctrl-Q that did what you wanted to do. Just point and click, it's that simple.

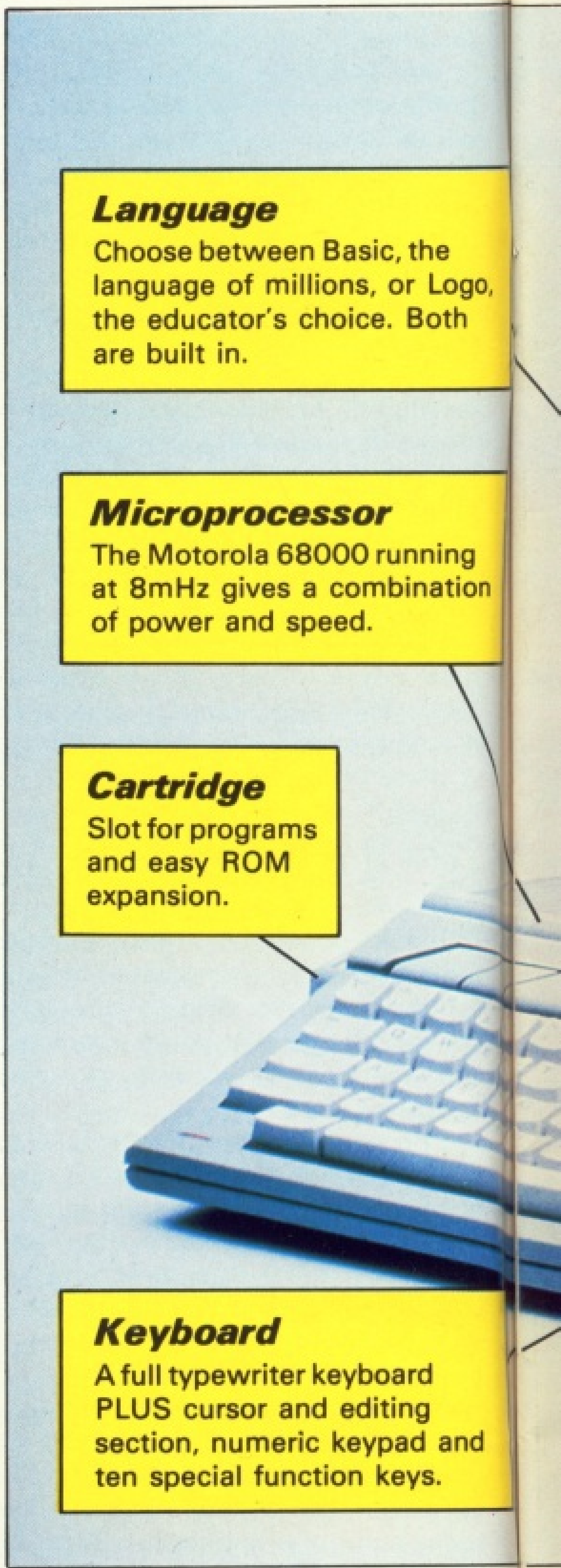
First in the range to arrive in Britain will be the 520ST, which has 512k RAM. Both it and the 128k 130ST have 192k ROM, expandable via the cartridge slot to a maximum of 320k.

With a list of features like these and a price well below comparable machines, it's no wonder the ST is causing such a lot of excitement.

IF there is one single feature of the ST that has caused most healdines in the computer press – and created most consternation in the boardrooms of rival manufacturers – it is GEM.

The revolutionary, easy-to-use Graphics Environment Manager brings to the ST a new dimension in personal computing. What it is all about is described in the following pages.

WHEN it arrives in Britain within the next few weeks the 520ST is expected to retail at between £600 and £700. The price will include a separate 500k 3½in floppy disc drive. This compares with £2,100 you have to pay for the 512k Macintosh, which has a similar operating system (but only allows a monochrome display), plus built-in disc drive and monitor. With the 520ST the monitor has to be purchased separately.





Monitor + GEM

Choose between high resolution RGB monitor, TV, or high resolution monochrome monitor. See the GEM operating system in all its glory.

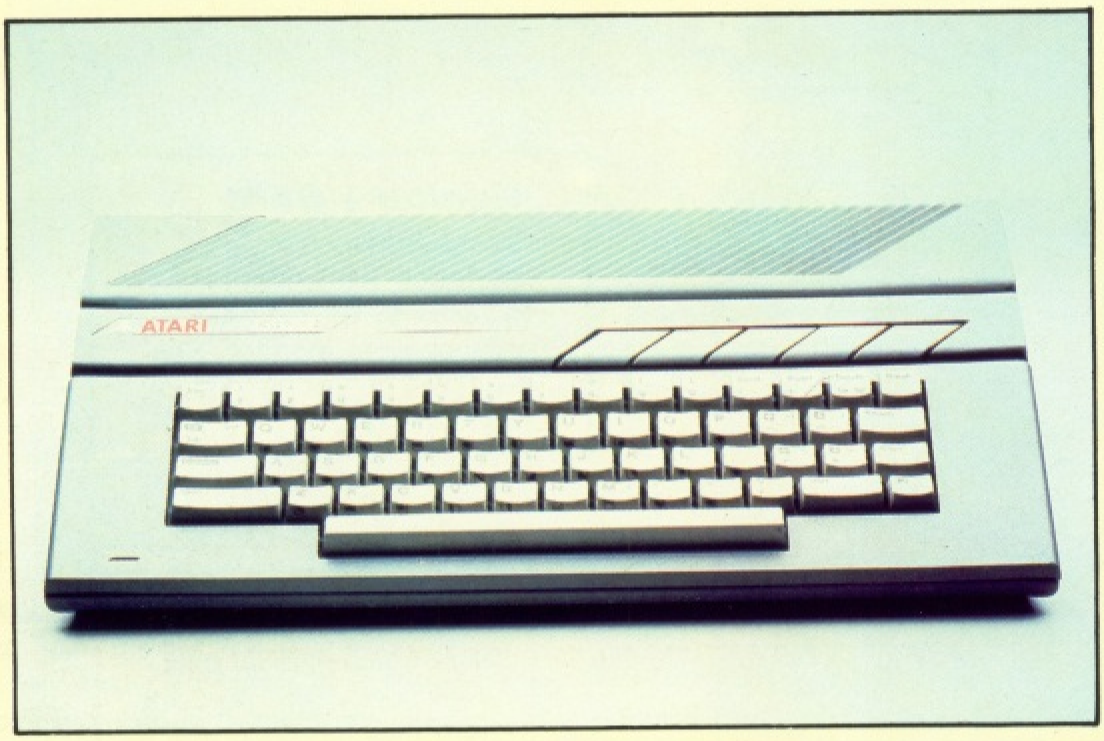
Expansion ports

RS232C serial port, Centronics parallel port, $3\frac{1}{2}$in floppy disc port and hard disc interface port cater for every need.

Mouse + joystick

Two joystick ports, one configured for the mouse – the latest in user-friendly input devices.

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New XE looks good – and it IS good!

FIRST of the new-look Atari machines to hit the British market is the 130XE. Like the previous generations of Atari – the 400/800, 1200XL and 600/800XL – it is based on the 8 bit 6502 chip.

In actual fact, the new machines use the 65C02, a more modern version of the chip which has a few extra commands and uses less power.

The 130XE is far more than just a good-looking version of the 800XL. For one thing it has a massive 128k of RAM – together with many other new features, product improvements and manufacturer's cost reductions.

All of which will help to make it a winner right from the start.

It has a great degree of flexibility in its screen display found in no other product line. It has 16 screen modes – 11 graphics and five text – player/missile graphics and four voice sound.

On the outside there's a bright new design. The keyboard has been improved and feels better than ever, and the familiar function keys – Select, Option and so forth – are now positioned across the top of the keyboard.

If you're wondering about the cartridge slot – don't. It hasn't been forgotten. It has switched from the top of the machine to the back. So you'll still be able to run all your familiar cartridge software.

Another major difference between the 130XE and the 800XL is that the new machine doesn't have the parallel input/output (PIO) connector on the back. However it should hardly be missed – Atari didn't use it for anything!

There will be two other machines in the XE range – the 65XE and the 65XEM.

The 65XE will have 64k RAM, and the 65XEM has a similar specification in everything except the sound.

You can think of the M as standing for Music, because instead of the standard four sound channels the XEM has eight channels and 64 harmonics. The superb quality sound is achieved by using a sampling rate of over 30kHz.

You may have read elsewhere of a 65XEP model. This was intended to be a portable version of the 65XE, but will not now be produced. However for those of you on the move, you may like to know that a 16 bit portable is promised instead.

One vital feature common to all in the XE series is compatibility with previous Atari machines – which means that the existing base of software, peripherals and applications will survive without growing obsolete.

MENTION the Atari ST range and the chances are that within the next few seconds someone will say "GEM". The acronym on everyone's lips looks set to become the operating system of a whole new generation of micros, and with good reason.

Digital Research, the company that gave us what is arguably the least user-friendly operating system in the form of CP/M, is now set to unleash its Graphics Environment Manager and show that the leopard can indeed change its spots.

So while we're looking at the ST, let's look at GEM and what it will mean for Atari users.

In the days when CP/M was developed most programs had nothing more than text output. Consequently, it wasn't too difficult to capitalise on the Z80 architecture and produce an operating system which could be implemented on practically any Z80-based micro.

On the wings of this operating system such programs as Wordstar flew to fame. While it was undoubtedly a good program, it could never have achieved the eminence it did without CP/M.

Then came graphics. Suddenly the world was brighter for the user, but infinitely darker for the commercial programmer.

For while most machines incorporated primitives to print characters to the screen, the number of systems for handling graphics was almost equal to the number of brands of micros.

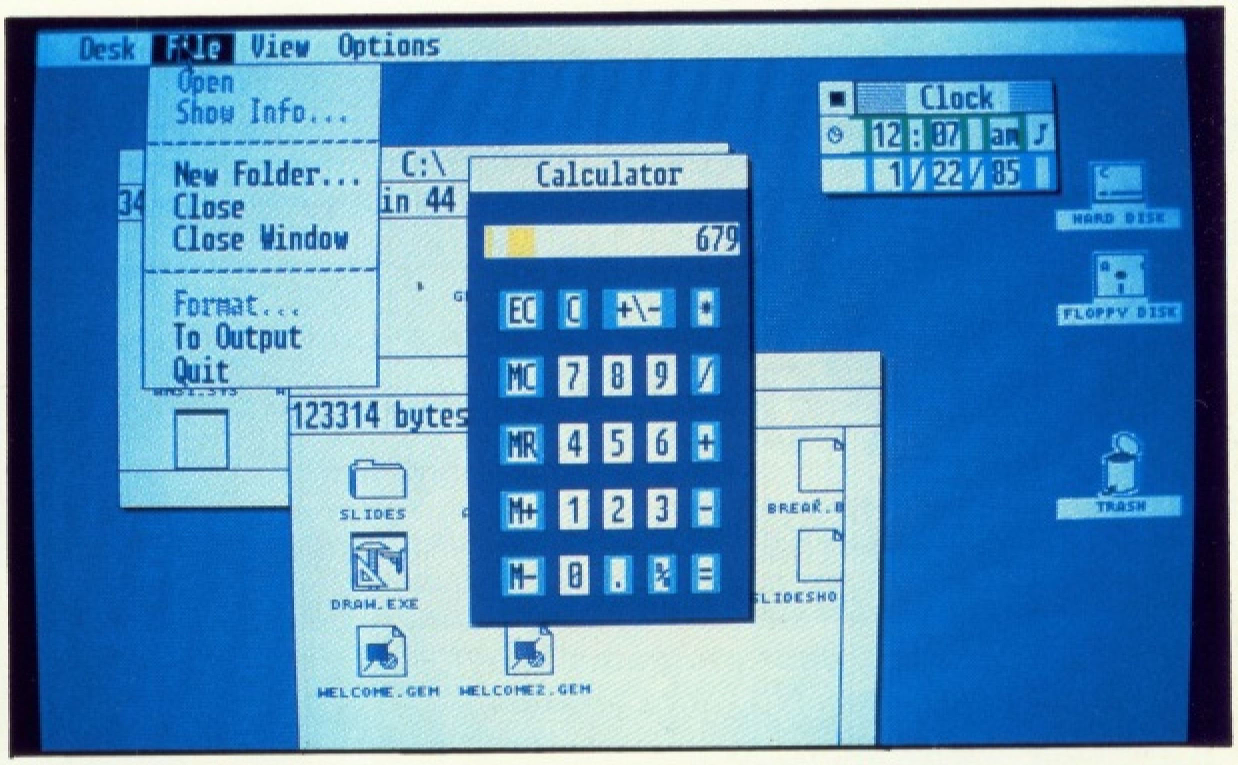
In crude terms, GEM is a graphics equivalent of CP/M, but this time not tied to a particular chip. However in order to do justice to GEM we need to consider another historical strand.

That is the one which stretches back from Apple's Macintosh to the research conducted by Xerox at Palo Alto. As Jack Tramiel has pointed out, GEM doesn't copy Macintosh so much as draw on the "desktop metaphor" which came out of the Xerox research.

Whichever way you look at it, the result is the WIMP philosophy – Windows, Icons, Mouse Programs. Because they share the same underlying ideas, GEM screens and Macintosh screens have a definite similarity.

Of course the major difference is

It's a GEM of an operating system!



portability. The mistake which Apple seems to have made is in assuming that the user friendliness is a function of the Macintosh, whereas it is actually a function of the underlying philosophy.

While the Macintosh is a delightful "one-off", GEM has the advantage that programs can be easily ported between machines which support the operating system – and this time DR haven't tied it to a particular chip.

For while Atari's ST range is the most publicised supporter of GEM, the system will become available on other 8088/8086 based machines. In fact, since it's largely written in C, it could be implemented on any machine which supports a C compiler – which includes the Macintosh.

The advantages of a portable operating system might not be immediately apparent to the owner of a single micro. However when it comes to buying software the advantages become obvious.

Ian Turner, Ashton-Tate (UK)'s technical director, neatly summarises the advantage: "GEM offers an up-to-date, very user friendly environment vital to the continued development of complex integrated packages like dBase III and Framework.

"For Ashton-Tate, which is not committed to a sole machine or system, GEM's easy portability strongly supports our future development strategy".

This means that with GEM on the Atari ST you can look forward to a wealth of powerful software while enjoying the acme of user friendliness.

More than 70 UK software companies ordered the GEM Programmer's Toolkit on the first day it was available in this country. Hence the ST shouldn't need to rely on imported – and therefore artificially expensive – software, as has the Macintosh.

All in all, the value for money offered by the Atari ST range and the advantages of GEM in terms of user friendliness and software availability look like producing a winning combination.

In the words of Sam Tramiel: "We chose the GEM interface because it represents the most advanced microcomputer technology for consumers to learn and use personal computers. It will help place Atari in a position to offer a powerful, easy-to-use personal computer at a low cost".

Unusually in the micro industry, this time the hype has an awful lot of truth in it.

AS an operating system, GEM interfaces between the user and the machine. However, what makes GEM different is its extreme user friendliness.

Traditional computer commands and keyboard entries have been replaced with easy-to-understand graphic images and an easy-to-use pointing device called a mouse.

Across the top of a GEM screen you'll see Menu Bars. Without once touching the keyboard, you can use the mouse to 'pull down' one of the menus and make a selection from it. It's as simple as that.

Organising your work is so much easier with GEM. By manipulating the screen display with the menu, you can collect a set of files into a folder, just as you might in your traditional filing cabinet. You can even put folders within other folders.

The GEM desktop also gives you access to the sort of tools you'd normally have on your desk like a calculator – no more searching through the desk drawers when all you want to do is one quick calculation.

Scissors and paperclips are also there, along with the most vital part of any office – the waste paper basket!

With GEM, moving information between files becomes much simpler. You can write the bulk of a report with your word processor, then 'cut and paste' into it information from your spreadsheet and database files.

To help you make the most of your Atari. .



Normal price £195

Our price £164 Inc.VAT &carriag

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Why you should give your Atari

Disc Power!

Look what you get when you link your Atari to the versatile 1050 Disc Drive:

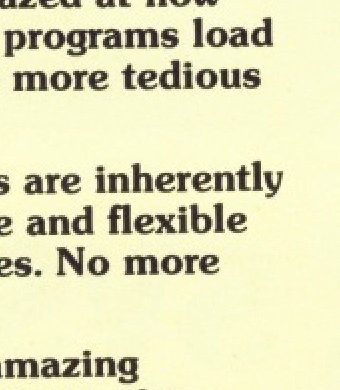
It's speedy! **You'll be amazed at how quickly your programs load and save. No more tedious waiting!**

It's sure! **Disc systems are inherently more reliable and flexible than cassettes. No more lost files!**

It's simple! **Despite its amazing capabilities, using the disc drive couldn't be simpler: it's easy to fit and even easier to operate!**

With the 1050 comes DOS 3, Atari's latest disc operating system. Featuring a wide range of utilities, DOS 3 supports both single and dual density modes, so you'll be able to take advantage of the wealth of disc software that is now available.

And to get you going, we're offering £17 off this special disc starter pack!



The Pay-Off. *An exciting adventure game that invites you to explore the dangerous streets of downtown New Jersey.*

Home Filing Manager. *A powerful database program that turns your Atari into a home filing cabinet.*

Sound & Graphics Demonstration. *See – and listen to – your Atari at its very best. Programs that stretches the power of your Atari to its very limits. An incredible experience!*

Complete package only £19.99

Let your Atari teach you French, German, Italian, Spanish!

Yes, you can turn your Atari into the world's most patient language teacher! Each pack in the "Conversational" series consists of five cassettes, designed to give you a thorough understanding of the language – ideal for studying before you go on holiday.

Normally £22.99 per pack.

Our price £18.99

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MicroLink

What MicroLink can offer you:

- *Registration on Telecom Gold – plus your own mailbox and security password – for only £5 compared to the normal £40.*
- *The biggest bulletin board of them all – with no waiting to take your place in the queue of callers.*
- *Direct contact, via electronic mail, with other users.*
- *The ability to send and receive telex messages, both within Britain and all over the world.*
- *Free access to Microsearch, our unique product locater – an easy-to-use index of products, prices and availability. With powerful keyword searching, you find what you want within seconds.*
- *A chat service for real-time keyboard-to-keyboard communicating. Meet people with the same interests as yourself, share ideas and experiences.*
- *The latest news about all that's happening in the world of microcomputing. Read it on your own screen long before you see it on the printed page.*
- *Free software you can download directly into your micro – and save for your own use.*

Let your Atari be your passport into the exciting world of telecomputing!



Price includes VAT, post & packing

IT'S the fastest growing field in micro-computing. All over the world micros are talking to each other over the telephone line. As well as to the ever-increasing number of public and private databases, bulletin boards – and even giant mainframe computers.

We want all Atari User readers to share in the new technology that makes all this possible. So we're offering a unique starter pack at an unbeatable price. It gives you everything you need to get in touch with the big wide world outside:

- **Modem**
- **Software**
- **Serial Interface**

The modem is the amazing Miracle Technology WS2000. One of the most powerful on the market, it provides all the facilities you require. Yet it's simplicity itself to use. Just plug it into a standard British Telecom jack and you're away!

The package also features the superb Datari serial interface, which links the modem directly to the Atari's peripheral port without the need for the 850 serial interface.

The best hardware deserves the best software to drive it, and with the comprehensive Multi-Viewterm programs the package is complete. It supports all the standard baud rates - 1200/75, 75/1200, 1200/1200 and 300/300 full duplex.

Your Atari User package will allow you to talk directly to other computers, to send your own telex messages, to go tele-shopping – even to download free software programs directly into your Atari.

You will be able to join Micronet/Prestel, which will immediately open up to you a vast menu of 750,000 pages of information – instant world news, sports, holidays, hotels, train and airline timetables, all regularly updated.

And you can become one of a growing number of enthusiasts who are joining MicroLink, the giant database set up in conjunction with Telecom Gold, which is described more fully alongside.

But first, send for the Miracle package – and enter the fascinating, limitless world of communications!

devised for Atari users . . .

in association with

TELECOM GOLD

COMBINE the enthusiasm of thousands of micro users with the mainframe power and versatility of Telecom Gold and the result is a vast, nationwide communications link that will open up an exciting new world for you to explore.

Go online to MicroLink and you're immediately connected to a rapidly-develping network of information and personal computing power. And all you need to become part of MicroLink is your Atari computer and an appropriate modem and software, such as the Miracle package described on this page.

Communicating the MicroLink way is not only fast – it's much cheaper than you might expect. For instance, even if you live outside the London 01- call area you can still get direct access to the Telecom Gold mainframe computer at local call rates.

You can use your electronic mailbox to send a whole-page letter for less than the cost of a first class stamp. And you can send the same message to 500 different destinations in the UK for no extra charge. (It would only cost you 30p more to send 50 copies to your friends in Australia!)

And you don't need to be a computer genius to use MicroLink! You get instant access to dozens of services with plain English commands, or by selecting what you require from a simple menu.

And the cost of using MicroLink? Just £3 a month. Plus small additional access charges which are fully detailed in our information pack. To obtain your copy, just tick the appropriate section of the coupon on Page 61.

** Telecom Gold is the trademark of British Telecommunications plc.*

Experience the thrill of a REAL arcade game at home!



No matter how many video games you've played, you've never seen anything like QIX. And no matter how many times you play QIX, you'll never play the same game twice - because there are thrillions of possible patterns to play with.
This is the game every Atari user ought to have by his machine – so we're offering our readers £2 off the normal price.

£7.99

You don't just play QIX – you FEEL it!

Use the order form on Page 61

A message from
ENGLISH SOFTWARE™
to all owners of
ATARI, COMMODORE 64, BBC B, ACORN ELECTRON and AMSTRAD Computers...

Software companies grow on trees ... at least that's the way it seems from the number of new companies springing up every week!

ENGLISH SOFTWARE was launched three years ago with a smashing little game for Atari Computers called **AIRSTRIKE 1,** which quickly became one of the most popular U.K. programmed games for the Atari.

Then, as now, Atari Computers were amongst the most advanced on the planet, but they were a **TRIFLE expensive!** But we knew that prices would come down, and that more people would soon appreciate the great range of Atari software produced by **ENGLISH SOFTWARE.**

But Atari owners **used** to be a funny lot, being heard to utter such gems as:

"It can't be any cop, if it costs less than £20"

Honestly, that's what they used to say! Anyway, in the face of this rather strange attitude, we went ahead and committed the ultimate sin:

ATARI GAMES AT £9.95!

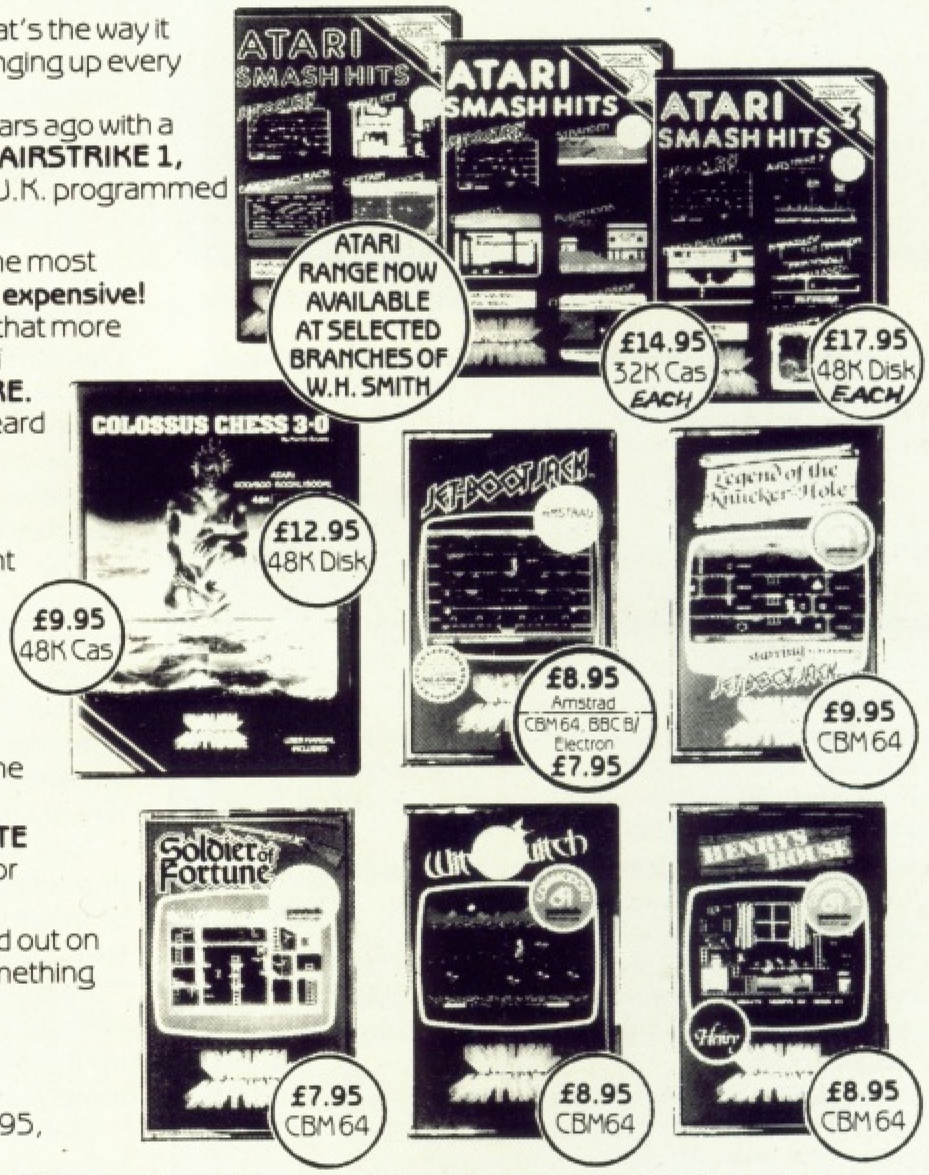
We expected some slight resistance to these prices from Atari owners who only equated high quality with high prices, but we were wrong: Everybody thought the prices were great, **and** the games too!

We even produced the fantastic **ATARI CASSETTE ENHANCER** at £7.95, a superb utility program for **BASIC** programmers.

So now, for those of you who might have missed out on **all** our excellent Atari titles, we are releasing something very, very special:

ATARI SMASH HITS Volumes 1, 2 and 3 from **ENGLISH SOFTWARE.**

Five great games on one cassette for only £14.95, or on disk at £17.95!



Each cassette features our top-rated **JET-BOOT JACK** plus four other popular titles. So now you have no excuse to miss out on the best range of U.K. produced Atari 400/800/600XL/800XL software for 32K machines. If your dealer does not yet have them in stock, ask him to order them from his nearest Atari wholesaler. It will be the best Atari buy **YOU** will make all year!

We have also just released **COLOSSUS CHESS 3.0,** the best chess program available anywhere for Atari 400/800/600XL/800XL computers with 48K. Very powerful, with lots of excellent features.

For our good friends with other home computers, our programmers are busy producing original games for you as well. They are all illustrated on this page. **HENRY'S HOUSE** on the Commodore 64, and **JET-BOOT JACK** on the Electron are now available at selected branches of **W.H. SMITH.**

Selected English Software titles are available at: HARRODS and selected branches of: **LASKY'S, BOOTS, GRANADA COMPUTER STORES, CO-OP STORES, THE SILICA SHOP** Mail Order and Retail and all good software stores.

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New deal on prices promised

A NEW deal for Atari users world-wide has been pledged by Jack Tramiel, the American entrepreneur who recently took control of the ailing corporation.

The man who turned Commodore International into a billion dollar success story has now predicted he will achieve the same for Atari.

And, along the way, he has promised continuing price benefits for the 21 million users of the corporation's products.

"I place my money where my mouth is", he insists.

"Since I acquired the Atari Corporation, prices of our computers have been nearly halved. And that is entirely as it should be.

"We're in the business of people's technology. And as Henry Ford said before me, 'For every dime you remove from the cost pyramid a whole new stratum of buyers are revealed'.

"I believe it and that's how this business is going to be from now on".

The reason for giving a public undertaking to his customers is that Jack Tramiel is angry about what has been going on in the personal computer marketplace.

"Too many people have got too fat out of this business", he insists. "But the consumer is catching on".

Warning

And he also took time out to issue a warning to the would be competition here in the UK that Big Jack Tramiel has them in his sights.

"There are one or two people who think they can outsell or out-produce me", he says. "Well, let me tell you that just one of my worldwide plants churns out more than the next top three UK companies put together.

"Technology is what this decade is about", he adds. "I've given this notion to my factories out in the Far East. They're gonna produce it at the price the man next door can afford".

DRIVE FOR EFFICIENCY

ON the day he started out in business more than 25 years ago, Jack Tramiel devised his own work ethic. And he has followed it religiously every day since. It is this:

"Never settle for doing things the way they were done in the past, always find new ways to do things better, more efficiently. Our customers are mature and intelligent people; we must give them the best for their hard earned money because, if we don't, they will know we have cheated them".



Massimo Ruosi, Atari's European general manager

Big sales ahead

ATARI'S newly-appointed European general manager, Italian Massimo Ruosi, has forecast spectacular results for his "patch" during 1986.

"Next year the European market is going to be bigger than the States", he claims. "It should top around six million units".

All aboard the Atari bandwagon

MANY leading high street retail chain stores are lining up to board the Atari bandwagon once the ST range starts rolling off the production line this summer.

Among the big names likely to be stocking the new Atari lines are W.H. Smith, Boots, Curry's and Lasky's.

All four have expressed interest in, or have been engaged in negotiations about, the Atari ST range.

John Rowland, computer merchandising controller at W.H. Smith, was very enthusiastic about the Atari's chances when interviewed recently on TV.

He said he would be selling the ST range in his retail outlets first, "then if it proves itself and lives up to its promise I think we'll put it into our business centres as well".

A Lasky's spokesman said: "It seems very likely that we'll be stocking the new computers, but then we are a bit biased as we already sell more Ataris than Spectrums.

"The Atari 800XL has done extremely well and we expect the same from the new products, judging by their specifications".

Boots confirmed it was discussing the possibility of stocking the new range with Atari, and Curry's merchandising operations director Simon Williams said: "The product looks extremely interesting.

"We are hopeful about stocking it and at the moment are in the process of finalising our negotiations with Atari".

Meanwhile Atari chief Jack Tramiel maintains his company will have captured a quarter of the British home computer market by the end of the year if not sooner.

He predicts sales of 200,000 Atari ST computers here in the next 12 months.

SOFTWARE ON THE WAY

AN impressive list of software houses is working on products for the ST range, according to reports from the US.

Heading the list is Microsoft, which is said to be converting its range of Macintosh software to take advantage of the ST's superior colour display.

Several of the country's top games companies have taken to the ST – among them renowned producer of flight simulators Sublogic, leading education software house Spinnaker, graphics specialist Penguin Software, and Microprose whose games have been brought to Britain by US Gold.

Atari Logo nominated for top award

GRAPHICS language program Atari Logo has been nominated for the British Microcomputing Awards 1985 in two major categories.

It has been shortlisted for both the Home Software class and Thames Television's Database Home Software of the Year award.

Recognised as the Oscars of the computer industry, the British Microcomputing Awards this year attracted more than 1,000 entries.

Organised by Personal Computer World, The Sunday Times and Thames Television, the awards seek to define technological excellence and value for money for the consumer.

All the shortlisted products are to go before a panel of judges who will then select the top three finalists in each category and ultimately the outright winner.

Judges for this year's awards include Robin Bradbeer, David Fairbairn, director NCC, Dr Ewan Page, president BCS, Janet Rothwell, NCC, John Turnbull, NCC, Philip Virgo, manager NCC Microsystems Centre, and Ian Werblow, president Computing Services Association.

The winners will be announced at a ceremony hosted by Sir Alastair Burnett in The Park Lane Hotel, London, in June.

At that time each finalist will receive a framed certificate, with specially designed award trophies for the eventual winners.

The proceeds of a souvenir brochure to commemorate the ceremony are to go to the Concerned Micros in Education and Training charity.

Now link up with Prestel

THE 300,000 pages on Prestel have at last been fully opened up for Atari owners by modem manufacturer Miracle Technology.

The new Multi-Viewterm/Datatari modem interface and software package makes all Prestel facilities available to Atari users who previously have had to make do with the limited access afforded by the 850 interface. Now the older interface – restrictive because of its inability to handle split baud rates – is no longer necessary.

The package allows baud rates of 1200/75, 75/1200, 300/300 and 1200/1200 and includes both Atari 13-way peripheral port plug and standard 25-way plug to fit the world standard modem from Miracle themselves, as well as many other modems.

The Datatari interface and Multi-Viewterm disc-based software also give the Atari owner access to other previously inaccessible viewdata systems, electronic mail, telex, database and user-user communications, plus telesoftware downloading.

The package can be used with Atari models 400, 800, 600XL, 800XL, 65XE, 65XEM and 130XE and costs £59.95.

Does your micro go bump in the night?

IT seems that Atari computers – along with ghoulies and ghosties – may be among the things that go bump in the night.

A scientific body which normally investigates strange phenomena ranging from the Loch Ness monster to UFOs has turned its attention to the machines.

Roger Morgan of the Association for the Scientific Study of Anomalous Phenomena (ASSAP) has written to *Atari User* for help with his research.

"Can I appeal to readers for any information, at first or second hand, no matter how bizarre, concerning unexplainable malfunction or unexpected output?" he asks.

Contacted at his London home, he explained: "We are looking for things like strange messages suddenly appearing on screens".

ASSAP, founded three years ago, has some 300 members across the country who devote much of their spare time to serious investigation of the paranormal and related fields.

It was recently called in to investigate reports of hauntings at Marylebone magistrates court and has developed an infra red video recorder to assist in its work.

Why has ASSAP suddenly become interested in computers?

"We feel they are a valid subject in the light of the fact we have collected some very interesting data from things run on electricity", says Roger Morgan.

Secretary of ASSAP is Dr Hugh Pincott who also believes computers may well act as vehicles for psychic phenomena.

"A particular interest of mine is regressive hypnosis where people reveal what apparently happened to them in past lives.

"Now one of the areas under investigation is the possibility of a cosmic database – a sort of big computer in the sky".

Atari – good moos for cows

ATARI technology is helping Britain's dairy farmers manage their herds more efficiently.

The 800XL is at the heart of a computerised animal husbandry system designed by milk yield monitoring and feeding technology experts Hunday Electronics.

The £1,495 Hunday Baby system – which includes computer, printer and software – is for dairymen with small herds of 20 or more cows who can't afford more expensive technology.

Hunday says it provides 90 per cent of the benefits of larger computerised dairy management packages and should pay for itself inside two years.

Efficient

The system, linked to electronically operated feeders, monitors yield and feed for each cow, enabling the farmer to set the most efficient feed supply for his animals individually.

It provides herd summaries showing cow performances, feed requirements and margin over concentrates, individual cow records and action lists for day-to-day herd management.

Hunday managing director Nick James told *Atari User:* "We chose the 800XL because we wanted a machine with a high level of programming language and a variety of software.

"In other words, the farmer is able to also run business software like accounts and word processing from sources other than ourselves.

"An additional bonus with the Atari is that while the farmer can use our system to manage his dairy herd more efficiently, the computer is also a family entertainment source on which his kids can play games when it isn't being used to monitor the herd".

ST range on schedule

ATARI has scornfully dismissed Sir Clive Sinclair's claims that its ST range may never reach the marketplace. In a recent interview Sir Clive said: "I'll bet you £100 . . . £10 . . . 10-1 . . . not a chance. I don't think it will appear at all".

But Atari UK product manager Jon Dean countered: "He's a great one to talk about products not being delivered on time.

"There is no foundation for Sir Clive's comments whatsoever. The product will be available here late June or early July as we have said all along".

Dean also scoffed at Sir Clive's comment that the ST "doesn't have any software". He recalled that Atari boss Jack Tramiel said as long ago as January that "by May we will have 25 to 30 ST software packages ranging from graphics to entertainment". That still holds.

And Dean added that so far 50 of the $4,500 development machines have been supplied to US software houses and would soon be available in the UK.

Minding the store

ATARI computers play a vital role in the day-to-day operations of leading mail order house Maplin Electronics.

An 800XL ensures efficient stock control in each of the firm's five high street branches.

And another Atari "minds the store" at weekends down at the company's Essex HQ.

Software for the system was custom designed by Keith Watterson, stock controller at the Manchester branch.

He told *Atari User:* "Although it's written in plain old Basic, the software runs fast enough for our needs and has been a big help in terms of efficiency.

"All the items in stock carry a code and every Friday we check the shelves to see what we're low on. A list of what we need for the following week is compiled and sent via our 800XL and modem to our mainframe at Rayleigh.

"The PDP computer at headquarters also handles orders placed directly by clients who own 300/300 baud modems and use our Cashtel facility.



Pack hits jackpot

THE Atari starter pack, which offers £200 worth of value for only £129.95 is creating record sales.

The pack combines an 800XL 64k computer with a 1010 program recorder and cassette versions of Invitation to Programming, Pole Position and a graphics demo.

Recognising that many customers want to use the greater flexibility and durability of disc drives compared with cassettes – but at prices they can afford – Atari also combined an 800XL with the 1050 disc drive and two discs containing Home Filing Manager along with The Pay-off game and graphics demonstrations.

At £249.99 this means a saving of £115 on the individual prices.

Atari UK marketing manager Rob Harding commented: "We believe that the first-time consumer is no longer satisfied with anything less than a 64k machine. They also require a package that can be used immediately – like our starter packs.

"A major Atari objective this year is to increase disc drive penetration of the market because of their superior performance".

Chat show goes live on Prestel

MICRONET has launched a major innovation in interactive viewdata – the first live programme on Prestel to be scheduled on a regular weekly basis.

Celebrity Chatline gives micro owners their first chance ever to interview well known personalities direct from their home computers over the Micronet system.

The service is a development of the highly successful Late Night Chatline which is second only to Micronet itself in the Prestel Top Ten of most popular areas accessed.

Celebrity Chatline is similar to Late Night Chatline's CB-style on-screen chat facility, except that Micronet editor David Babsky travels to the homes of selected celebrities.

As Micronet members electronically send questions on special message frames, the night's celebrity replies on-line straight away via his own home computer.

One of the first guests on Celebrity Chatline was Derek Meakin, managing editor of *Atari User* who commented: "It was gratifying for Database Publications to be chosen to help launch this exciting new development.

"This is yet another example of the pioneering spirit behind the Micronet operation and helps to explain why micro users are joining in ever-increasing numbers".

Celebrity Chatline is on Micronet 800 every Wednesdav between 7 and 8pm.

Rotterdam HQ for European operation

A MAJOR reorganisation of Atari Corporation was undertaken before the European launch of the new range of personal computers.

This has included centralisation of all European warehousing, distribution and administration functions in Rotterdam.

Atari Corporation chief Jack Tramiel explained: "From now on we are treating the European market in exactly the same manner as we treat the United States – that is as one single market.

"We believe the market will be dominated by multi-national companies achieving world wide economies of scale and with access to world-wide resources. Our structure will reflect that objective with the most modern, efficient and cost effective central distribution and administration system capable of handling volume sales".

Simon Westbrook, UK managing director, said: "All the other European operations of Atari have now adopted this pattern, with the UK being the last to do so.

"The requirements of our trade customers in terms of deliveries will be met through computerised call-off procedure linking factory production with the Rotterdam warehouse.

"In this way inventory control will be extremely tight and will slash inventory carrying, and therefore total costs".

Attack Squash!



THIS is a fast version of the original computer squash game, but much enhanced by the addition of sound – a cheery beep every time the ball bounces either on the sides of the court or against the bat and a repeated tone every time a ball goes out of play.

Its other feature is that as you improve in skill the game gets more difficult and if you then start to get worse it gets easier.

This means that your Atari will always give you a challenge that is suited to your ability – which makes it the perfect opponent.

At the start of the game the bat is at the bottom of the screen and in the centre. You control the left and right movement of the bat by pressing the appropriate arrow keys.

Every time you hit the ball the position of the bat changes. It moves nearer to the top of the

Attack Squash is just one of over 20 games listed in "The Atari Book of Games" by Mike James, S.M. Gee and Kay Ewbank. We're grateful to Granada Publishing for permission to reprint it here.

```
10 REM ATTACK SQUASH
15 DIM B$(4)
20 GRAPHICS 1+16
40 CH=(PEEK(106)-8)*256
50 CHORG=(PEEK(756)*256)
60 FOR I=0 TO 511
70 POKE CH+I,PEEK(CHORG+I)
80 NEXT I
90 GOSUB 1500
100 H=0
110 HT=0
120 D=19
130 BALL=0
140 C=2
150 GOSUB 450
190 X=10
200 BALL=BALL+1
210 IF BALL>10 THEN GOTO 890
220 A=10+INT(RND(0)*6)
230 B=2
240 V=1
250 W=1
260 Y=D
270 POSITION 3,21
280 PRINT #6;"BALL ";BALL;
290 GOSUB 1010
300 POSITION X,Y:PRINT #6;B$
310 POSITION 12,21
320 PRINT #6;"HIT ";HT
340 GOSUB 620
360 IF B+W<>Y THEN Y=D:GOTO 290
370 GOSUB 2500
380 POSITION X,Y
390 PRINT #6;"    ";:REM 3
400 GOSUB 620
410 POSITION A,B:PRINT #6;" "
420 IF D<19 THEN D=D+1
430 H=0
440 GOTO 200
450 REM COURT
480 FOR I=0 TO 19
490 POSITION I,0:PRINT #6;"$";
500 NEXT I
510 FOR I=0 TO 19
520 POSITION 0,I
530 PRINT #6;"$";
540 POSITION 19,I
550 PRINT #6;"$";
560 NEXT I
570 RETURN
620 REM BOUNCE
650 POSITION A,B
660 PRINT #6;" "
670 A=A+V
680 B=B+W
690 IF A=18 OR A=1 THEN V=-V:GOSUB 200
0
700 IF B=1 THEN W=-W:GOSUB 2000
710 IF B+W=Y THEN GOTO 770
740 POSITION A,B
750 PRINT #6;CHR$(5+128)
760 RETURN
770 R=A-X
780 IF R<0 OR R>2 THEN GOTO 740
```

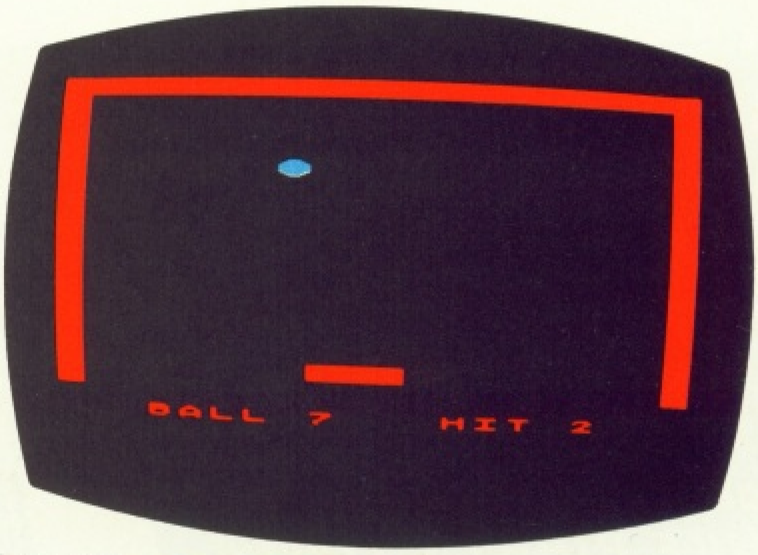
screen – which makes returning the ball more difficult. If you then miss a shot the ball will move back one position, making it easier.

You score a point for every hit and you will be served a total of 10 balls. Information about the number of balls played and hits scored is displayed on the screen continuously.

This program is a fairly straightforward application of the Atari's user-defined graphics. Only two new characters are defined – the solid block for the court sides and the round ball shape – so you should be able to follow the details quite easily.

Another feature to note is the way the sound is used to make the bounce of the ball seem more positive.

If you want to see the effect of leaving the sound out change line 2000 to **RETURN**.

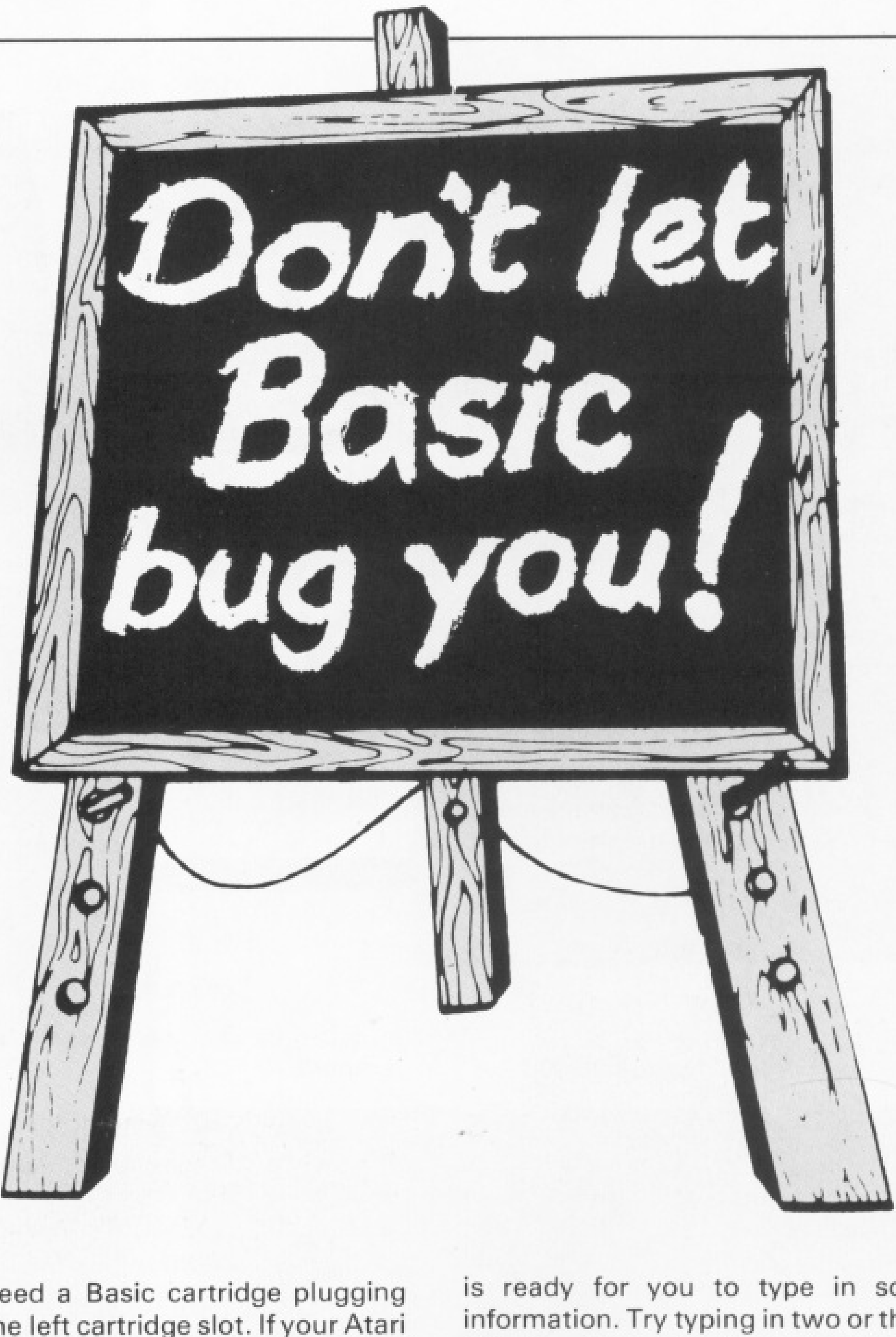


SUBROUTINES

15 Sets up variables and graphics characters.
150 Sets up court and balls.
200 Main play loop.
450 Draws court.
620 Bounce routine.
770 Moves bat up screen.
890 End of game – prints final score and offers another game.
1010 Subroutine to move bat.
1200 Blanks left of bat.
1250 Blanks right of bat.
1500 Defines graphics character for solid block.
1600 Defines graphics character for ball.
1700 Change to RAM character set.
2000 Sound routine for hit.
2500 Sound routine for miss.

```
790 W=-W
800 GOSUB 2000
810 H=H+1
820 HT=HT+1
830 IF H<>1 THEN GOTO 720
840 H=0
850 IF D>3 THEN D=D-1
860 POSITION X,Y
870 PRINT #6;"   ";:REM 3
880 GOTO 760
890 FOR Z=1 TO 1000:NEXT Z
900 GRAPHICS 0:POSITION 10,10
910 PRINT "You Scored ";HT
950 PRINT "ANOTHER GAME Y/N ";
960 DIM A$(1)
970 INPUT A$
980 IF A$="Y" THEN RUN
990 PRINT ""
1000 END
1010 K=PEEK(764)
1040 IF K=7 AND X<16 THEN GOTO 1200
1050 IF K=6 AND X>1 THEN GOTO 1250
1060 RETURN
1200 POSITION X,Y
1210 PRINT #6;" ";
1220 X=X+1
1240 RETURN
1250 POSITION X+2,Y
1260 PRINT #6;" ";
1270 X=X-1
1290 RETURN
1500 POKE CH+(ASC("$")-32)*8+0,255
1510 POKE CH+(ASC("$")-32)*8+1,255
1520 POKE CH+(ASC("$")-32)*8+2,255
1530 POKE CH+(ASC("$")-32)*8+3,255
1540 POKE CH+(ASC("$")-32)*8+4,255
1550 POKE CH+(ASC("$")-32)*8+5,255
1560 POKE CH+(ASC("$")-32)*8+6,255
1570 POKE CH+(ASC("$")-32)*8+7,255
1600 POKE CH+(ASC("%")-32)*8+0,60
1610 POKE CH+(ASC("%")-32)*8+1,126
1620 POKE CH+(ASC("%")-32)*8+2,255
1630 POKE CH+(ASC("%")-32)*8+3,255
1640 POKE CH+(ASC("%")-32)*8+4,255
1650 POKE CH+(ASC("%")-32)*8+5,255
1660 POKE CH+(ASC("%")-32)*8+6,126
1670 POKE CH+(ASC("%")-32)*8+7,60
1700 POKE 756,CH/256
1710 POKE 752,1
1720 B$="$$$"
1730 RETURN
2000 SOUND 0,80,10,8
2010 FOR T=1 TO 10:NEXT T
2020 SOUND 0,0,0,0
2030 RETURN
2500 FOR I=1 TO 10
2510 SOUND 0,160,10,10
2520 GOSUB 2000
2530 NEXT I
2540 RETURN
```





Programming is easier than you think – and doubly so if you follow MIKE BIBBY's crystal clear guide through the micro jungle

I DON'T know who you are. You might be a wife whose Atari owning husband is away at work, or a father who is trying to come to terms with his daughter's Christmas present. Alternatively you might be a teacher who has just been "computerised".

Whoever you are, the fact that you are reading this article tells me your guilty secret: You want to be able to program the Atari micro.

But how to begin? You must have noticed that some people take to computing like ducks to water, or an output port to an interface, as they would say.

Words like byte, strings and user-defined functions flow freely from their lips. They pass parameters and handle interrupts with ease, then get their hands on the peek and poke in a way that beggars belief!

You, I take it, are not like that. You are not a computer "natural". But you would dearly like to be. Well fear not, this series is for you, and it was written by one of your kind.

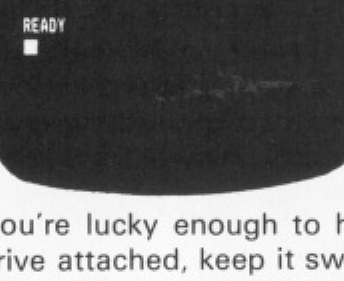
I, too, have sat at a keyboard, watching the cursor without having any idea of what to do next (or even knowing it was called a cursor).

I also know what it's like to have someone explain something to me in the "simplest possible terms" and still find it way above my head. Yet I now programme reasonably well . . . and so can you. Read on!

Let's assume for a start that you are seated in front of the computer which is already plugged in, connected to the TV and tuned in correctly.

Some versions of the earlier Ataris will need a Basic cartridge plugging into the left cartridge slot. If your Atari is of this sort, make sure the cartridge is in. And that is the end of our assumptions.

The "On" switch is a rocker switch at the rear of the computer on the left. Reach over and switch on (and the TV if necessary). You'll hear some buzzing from the speaker of your TV and then the message READY will appear, together with a rectangular blob, the cursor.



If you're lucky enough to have a disc drive attached, keep it switched off for the moment – you won't need it.

The READY message is called the prompt. This indicates that the micro is ready for you to type in some information. Try typing in two or three letters – just part of the alphabet for the moment, please.

You should soon see that the cursor indicates the position at which the next letter will be printed on the screen.

Before we type any more, let's examine the keyboard. Fundamentally, it is a standard typewriter keyboard surrounded by several additional keys. Notice that the computer has a 0 (zero) key and another key for the letter O.

You must keep the two separate: 0 for numbers, O for words. I guarantee that a lot of your early errors in programs will be caused by typing O instead of 0!

On the same lines, notice that there is a 1 (one) key. Make sure you do not use l. (Incidentally, a lot of your other early errors in your computing career will be from misreading 1 as l and vice-versa.)

Other keys are labelled by words such as Shift, Esc and Return. Let's

As far as the computer is concerned "end" and "END" are different words . . .

introduce a convention to make life easier: If I want you to press the key labelled Return, for instance, I will ask you to press:

[Return]

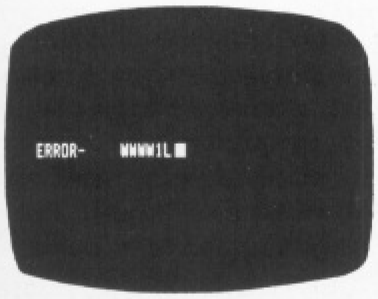
If I ask you to type RETURN you have to type **R**, then **E**, then **T** and so on. The symbols [] enclosing a word indicate that you are to press one key with that word on it. You do not spell it out.

Now Return is quite an important key. We use it in a similar manner to the return key on an electric typewriter, to ensure that the typing continues on a new line. It is far more important than that, though. Return not only gives you a new line but also sends the message typed into the computer to be acted upon.

If you have been following so far, you should have typed a few letters on your screen so that it looks something like:



If not, type a few letters now. Next, press [Return]. Odds on, you'll get a message back from the computer saying:



Don't worry about the ERROR message. You can't hurt the computer by accidentally mistyping something, so feel free to experiment.

All that ERROR means is that the computer doesn't understand the words you've just sent it. You see, it needs to be spoken to in its own language, which is called Basic.

However learning Basic isn't like learning a genuinely foreign language. Basic is very similar to English but it only allows selected English words – called keywords – to make things simpler for the computer.

This, by the way, is the reason I said that it was odds on you would get ERROR returned from the computer.

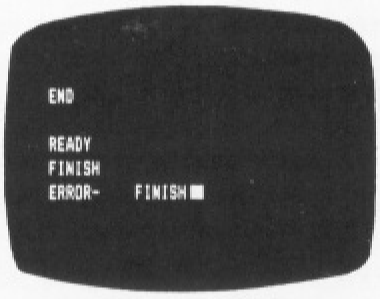
You might, by chance, have hit on a Basic word. For example, in Basic you can mark the end of a program with END. The people who designed Basic could have chosen the word FINISH to do this. Type:

END

and press [Return]. Then try:

FINISH

and press [Return]. Note the difference:

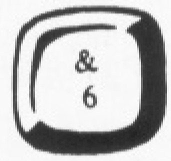


Admittedly, END doesn't accomplish very much – after all, you haven't anything in there to end, have you? – but at least the computer doesn't hurl the message ERROR at you as it did with FINISH. This is because END is a Basic word, while FINISH isn't.

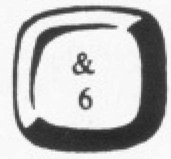
So far, your typing should have been appearing in upper case, that is capitals, only. Let's investigate.

If you look at the lower right-hand corner of the keyboard you will see the keys Caps and Shift. All the letters of the alphabet that you type will appear in capitals, unlike a typewriter which prints in lower case unless you hold down the shift key.

In this state, which we call "Caps Locked", pressing a key with two characters marked on it will cause the lower character to appear on the screen. To obtain the upper character, press the key while at the same time holding Shift down. For example, pressing:



will give you 6 on the screen while pressing:



and [Shift] will give you & on the screen.

Here I introduce a convention: If I want you to press two keys at the same time, I join these keys with +. To enable the keyboard to function as a normal typewriter press [Caps]. If you type now, you will find that the alphabet appears as lower case unless you press [Shift] down with it, when it will appear as capitals. Remember, if you want to get onto a new line, just press Return and ignore any resulting ERROR message.

If you press [Caps] once more you'll be back to the situation when you switched on, with the alphabet appearing in upper case whether you press [Shift] or not.

Press [Caps] once more and the letters will once more appear in lower case until shifted, and so on.

At the moment the keyboard should be acting like a typewriter – giving upper and lower case. If not, press [Caps] once more.

Get onto a new line by pressing [Return] and type:

end [Return]

You should get ERROR, which proves that, as far as the computer is concerned "end" and "END" are

→

different words. It recognises "END" as the Basic keyword but not "end". This is the reason for the Caps key. If you have this on, you automatically type in letters of the alphabet in capitals, so preventing you from mistakenly entering "end" instead of "END". For the present I am going to assume that all your typing is done with Caps on. If it is not on at the moment (which it won't be if you have been following), just press that key once to rectify the situation.

You've probably noticed that holding a key down for more than a fraction of a second causes that letter to repeatedly type itself out on the screen. If you haven't try it now. This behaviour is known as the auto-repeat.

By now you will have probably filled up a screenful of text and seen the scrolling action demonstrated. If not, press [Return] several times in succession or, more sophisticatedly, hold [Return] down and let the auto-repeat do the work for you. As you'll soon see, scrolling is when the top of the screen rolls up to allow more typing at the bottom.

You could, if you wanted, clear the screen like this, by keeping [Return] down until everything scrolls off the screen.

An easier way to do this is to press the [Shift] key together with the key marked [Clear], which you'll find in the top row of keys on the right. Try it.

You can achieve the same effect by using the [Control] key instead of [Shift]. So [Control] + [Clear] will see the screen off, too.

[Control] is quite an important key. Just as we can combine shift and the alphabet keys to alter what we get in the screen (capitals instead of lower case), so we can combine [Control] and other keys to give special effects.

Try [Control] + 2. The micro should beep at you. We'll look at other uses of Control later.

To conclude this preliminary examination of the keyboard, I suggest that you clear the screen if necessary, then type in a few letters (without pressing [Return]). Now press [Delete] once. The last letter you typed should disappear, its position being taken by the cursor.

If you keep [Delete] down, the auto-repeat will function and erase your whole line. You can use this to correct typing errors. Simply erase back to the mistake and retype.

This is just one form of what is called screen editing. There are other ways, involving the →, ←, ↑, ↓ and [Insert] keys, but these can wait a while.

Right, it's a computer so let's get it to compute. But don't worry, this isn't going to turn into a mathematical treatise. After a brief but necessary foray into simple sums, this article is thoroughly non-mathematical.

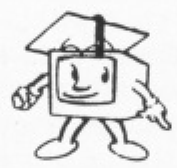
Before we start, let me give you a warning. The computer will do exactly as you tell it but only what you tell it. It's a very literal machine and in this respect is like my daughter on a

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mischievous day:

When asked to put on her pyjamas for bed she did exactly as she was told. Of course, I hadn't asked her to take her other clothes off first, had I? You can imagine the results . . .

Similar things happen with the computer. Say we want the computer to calculate 2+2. Not only do we want it to do the sum but we want it to tell us the answer when it's done it.

We instruct the Atari to write things on the screen with the Basic word PRINT. This is a relic from the days when the computer's output, as it is called, was actually printed out on paper rather than on the screen as it is now.

So, to see the answer to 2+2, type:

PRINT 2+2 [Return]

Note that you don't need the = sign as you do on a calculator. [Return] takes care of that. Before continuing try a few simple additions.

Just as the computer does not allow you to use O for 0, so it does not permit you to use x for multiply. The computer uses the symbol * instead. For example try:

PRINT 4*3 [Return]

Minus (–) is straightforward. You'll find it sharing a key with an underline character and a vertical arrow. Divide, however, is not ÷ but an oblique stroke (/).

For example, 12÷4 becomes:

PRINT 12/4 [Return]

Though this may seem at first a little odd to you, you have met it when dealing with fractions: 3÷4 is equivalent to the fraction 3/4.

Try:

PRINT 3/4 [Return]

From now on I am going to assume that you accept that before the micro can act on your instructions, they must be sent to it by [Return]. I may therefore omit [Return] from my examples. Make sure that you don't.

Before experimenting with further sums of your own devising, I'd like you to try the following sequence:

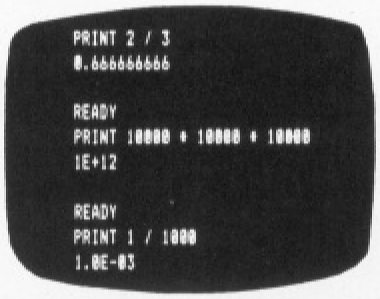
PRINT 2+8–3
PRINT 4*8/2
PRINT 4*8+2
PRINT 4*(8+2)

If you think carefully about the results you'll see that the computer interprets sequences of sums in the order you learned at school. You do whatever is inside brackets first, then mutiplication and division, then finally addition and subtraction.

Now try:

PRINT 2/3
PRINT 10000*10000*10000
PRINT 1/1000

If you have done this correctly, your screen should display:



The point to stress here is that the computer works to a limit of accuracy. For example, 2/3 is not exactly 0.666666666. The error is well under a millionth, though. Still, it must be borne in mind.

Similarly, with especially large or small numbers, the computer saves space by storing them using a scientific notation called exponent format. Here, for example, instead of printing out the answer to 10000*10000*10000 as 1000000000000, it prints out the result as 1E+12.

For E, which stands for exponent, you should read "multiplied by 10 to the power of". For example, 1E+12 means "1 multiplied by 10 to the power of 12" which, if your maths is up to it, gives you the correct answer.

Similarly, the answer for 1/1000 was returned as 1.0E–03 which reads as "1 multiplied by 10 to the power of –3" which is 0.001, the correct answer.

If you don't follow all of this, don't worry. I've only covered it to warn you about odd looking results to your sums which might pop up and confuse you.

Now let's try to get the computer to print out some words. Let's get it to print out **Hello.** If you cast your mind back to your schooldays (and for some of us that's an awful long throw), you'll remember that when someone says something you surround what that person says with quotation marks (or quotes, for short), such as: He said, "Hello".

In Basic, of course, we don't say words, we PRINT them, but we do surround them by quotes. We omit, however, the comma and full stop. Try:

PRINT "Hello" [Return]

and the computer should print out **Hello.**

Notice that the quotes are not printed. So to get the Atari Basic to print out a message on its screen we just use PRINT followed by the message surrounded by quotes.

The message inside the quotes is called a string – since the micro considers it to be just a string of letters – or a string literal. The latter is because the computer prints out literally, or exactly, what is between the quotes.

So:

PRINT "Hello"
PRINT " Hello"
PRINT " Hello"

give different outputs since in each, different numbers of spaces precede the **Hello.**

Actually, strings do not have to be words. They can be any combination of symbols, including numbers. Just keep them in quotes:

Try the following:

PRINT "4*3"
PRINT 4*3

This should convince you that the computer does print out strings – that is what is between the quotes – literally. When the calculation is in quotes the computer simply echoes the sum on the screen. When the calculation is not in quotes, the computer prints out the answer.

Experiment with printing out various messages on the screen. How long can you make them? Try lower case words as well.

At the moment the computer is responding to our commands as soon as we send them by pressing [Return] but in a calculation or task requiring several steps this can be rather tedious.

It would be more satisfactory to give the computer a whole sequence of instructions that it could get on with rather than spoon-feed it step by step.

This is possible.

Such a sequence of instructions is called a program and next month we will begin writing some.



Dare YOU g



AN adventure is a fantasy world which you, the hero, have to explore, often with the object of finding treasure or rescuing princesses, and generally being a hero.

Kids stuff? Not at all.

The crafty programmer who's written the game doesn't want you to win too easily. So he makes it as hard as possible, which is often very hard indeed.

Believe me, when you've spent an hour trying to find a key to open a mysterious locked door only to find that the door is locked from the other side, you'll be ready to strangle that programmer.

An adventure is like a detective novel, full of clues, puzzles and red herrings. Your job is to sift the clues, solve the puzzles and, hopefully, recognise the red herrings.

What's more, because you're in a fantasy world, with its own natural laws, you can also have goblins, magic or even aliens to cope with.

Not quite that easy after all, is it?

So where do these adventure games come from?

They owe their origins to the Dungeons and Dragons craze that swept America in the mid-1970s. Two mainframe programmers, Crowther and Woods, wrote a program called Collossal Cave, which simulated a D&D game, but had more emphasis on problem solving and less on fighting monsters.

This quickly achieved cult status among other programmers, and might have remained on mainframes but for an enterprising man called Scott Adams.

He adapted one of these massive programs to a 16k TRS-80, published it, and the first adventure for a home micro, Adventureland, was released.

Since then many adventures have been written. They can be split into two basic types – role-playing and text.

Role-playing games tend to simulate a D&D game very closely, in that you choose the type of role you wish to play, such as warrior, cleric, barbarian, wizard and so on.

On the basis of your choice you're assigned strengths and weaknesses which you exploit to achieve the objectives set in the adventure, like collecting treasure.

Since this treasure is almost invariably in the possession of some monster or other you spend most of your time fight-



go Adventuring?

By BRILLIG

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ing them. The result is that your progress often seems to depend more on luck than skill.

A good example of this type is the highly-acclaimed Ultima series – I, II and III are already available, with IV due out "real soon now".

Text adventures earn their name because they originally consisted of text only, and were based on the same type of format as the original Crowther and Woods game.

The classics here, apart from the Scott Adams series, have to be the Zork trilogy. However, it's good to note an English software house, Level 9 Computing, with a well-earned reputation in this field. Their version of Colossal Adventure gives the original game with a few extras.

Some adventures are described as "graphic adventures" or "hi-res adventures". These are basically text adventures with pictures and the format is pretty much the same as for text adventures, but with only three or four lines of text visible. Effectively, the picture replaces much of the description of the location.

There was a time when hi-res adventures threatened to push pure text adventures out of the scene completely. However, the success of Infocom and Level 9 shows that text adventures have staying power. As long as there are plays on the radio, there'll be a place for pure text adventures – the best pictures are the ones in your imagination!

With adventures, you either love them or hate them, and it's very hard to drag away the adventure fanatic from his machine long enough to talk about them.

You must have seen one of these adventure freaks. They're the ones who come to the computer club bleary-eyed from playing their latest game until three in the morning.

Yes, I know you thought he was an insomniac, but now you know.

What's so special about these adventure games?

I gave you an idea earlier of the object of them, so let's give you an example from that first Scott Adams game.

The aim is to collect and store 13 treasures. To get one of them you have to wake a sleeping dragon with some bees.

The bees have to be caught in an empty bottle – after you have first covered yourself in mud to stop them stinging you.

The bottle is full at first and







has to be emptied over some lava to get another treasure.

However once you get to the location where you empty the bottle you need a rug and a magic word to get out.

To get the rug you need to rub the lamp in another location.

Not only that, you have to climb down a hole to get the means to light the lamp, which you find by chopping down a tree, after you've first climbed it to get the key which opens the door . . .

Phew! Bit involved isn't it?

But that's where the attraction lies, in solving the puzzles, progressing through the locations and getting that final message on the screen:

```
CONGRATULATIONS! YOU ARE
  A MASTER ADVENTURER
```

I know it must seem very complicated, but adventures are totally logical. Admittedly that logic is sometimes very obscure but all the puzzles can be solved.

And there is no greater feeling than to solve a problem that has been stumping you for hours.

Now I've got you interested in them and you're all going to rush out and buy up the shop, let me give you the bad news: ALL adventures are very hard for ALL beginners.

The good news is that they are just like everything else. The more you do them, the better you get.

I well remember my first game, and I can assure you it was not a very auspicious beginning.

However there are certain things common to most adventures. I will explain how to cope with them so that your first game won't be quite as traumatic as mine.

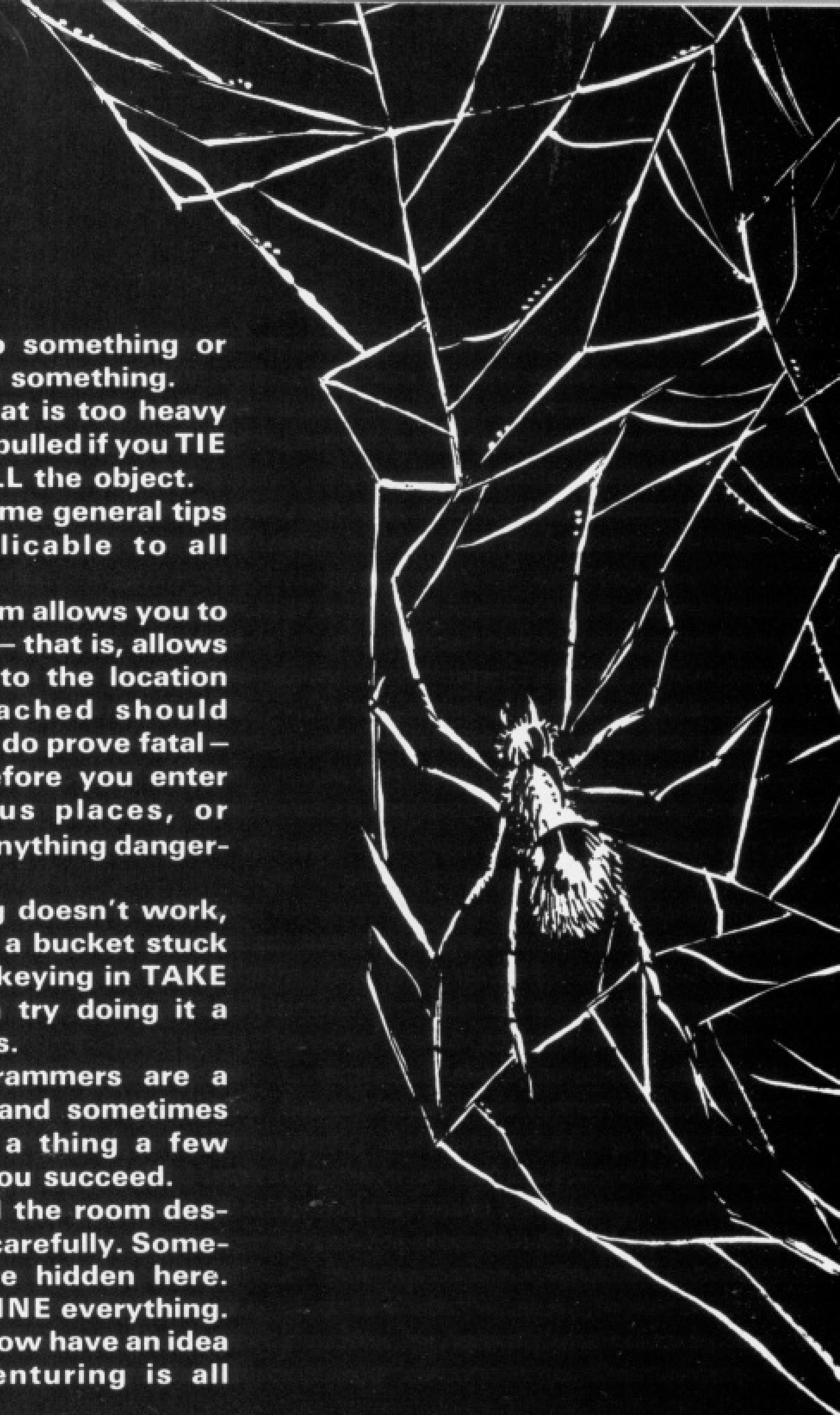
Most, if not all, adventures have a maze in them somewhere. Often these mazes are logical, so if you go North and then South you end up in the location you started from.

Others are not so logical, but the answer for both is the same – make a map.

If you cannot recognise your location from the objects present, room description or the direction of the exits, then drop some of your own objects and make a map based on them.

Some adventures have more than 200 locations, so it is a good idea to make a map of your travels anyway.

Another thing common to most adventures is ending up



in the dark, often underground or in unlit rooms. Obviously you need to get a lamp or torch or at least some matches.

Should you come across one in your travels always check to see if you can light it first. Do you need matches or batteries – or oil if it's an oil lamp?

If you do end up in PITCH DARKNESS, try and reverse the move you have just made. If that proves fatal, try and find the lamp and the means of lighting it before you re-visit that location.

If you've got the lamp, try LIGHT LAMP or ON or anything else you can think of before moving.

A few other things that might help you which should be obvious are to do with shovels, scenery and ropes.

If you find a shovel it's a good bet that you will have to DIG somewhere, either to find a treasure or to get an object that will help you somewhere else in the adventure.

Examine your surroundings. If you are in a forest, can you climb a tree? Or if you've got an axe, can you chop that tree down? Can you climb a wall, or a statue?

If you find a rope it's likely to be needed somewhere either to climb something or perhaps to pull something.

An object that is too heavy to lift might be pulled if you TIE ROPE and PULL the object.

There are some general tips that are applicable to all adventures.

If the program allows you to save the game – that is, allows you to return to the location you have reached should something you do prove fatal – then use it before you enter any suspicious places, or before trying anything dangerous.

If something doesn't work, such as taking a bucket stuck in the mud by keying in TAKE BUCKET, then try doing it a couple of times.

These programmers are a crafty bunch, and sometimes make you do a thing a few times before you succeed.

Always read the room descriptions very carefully. Sometimes clues are hidden here. Always EXAMINE everything.

I hope you now have an idea of what adventuring is all about.

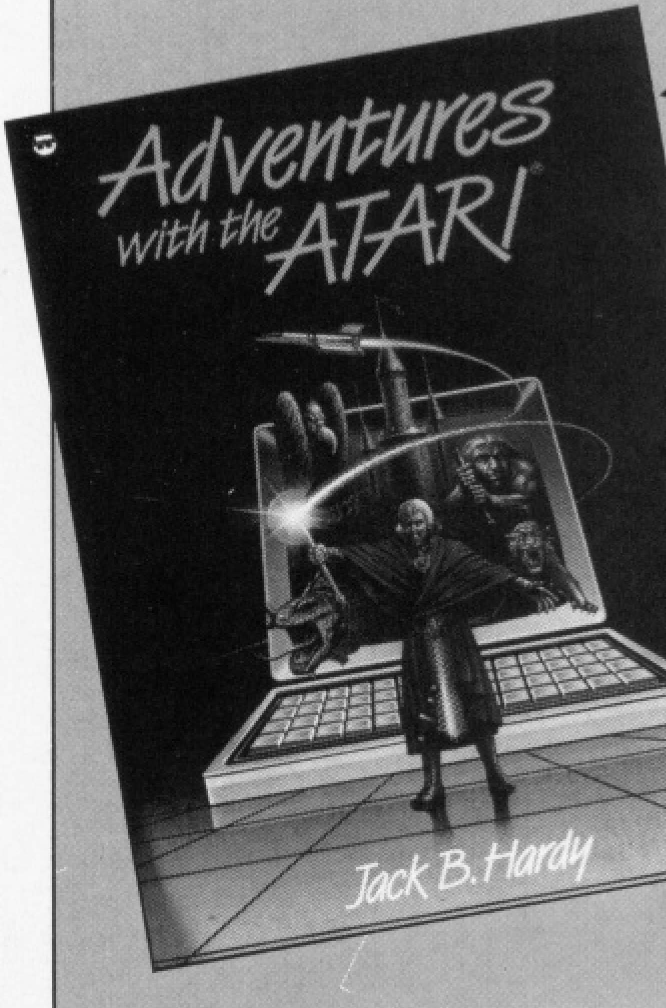
You never know, maybe we'll be seeing *you* staggering into the computer club with bleary eyes sometimes.

Happy Adventuring!

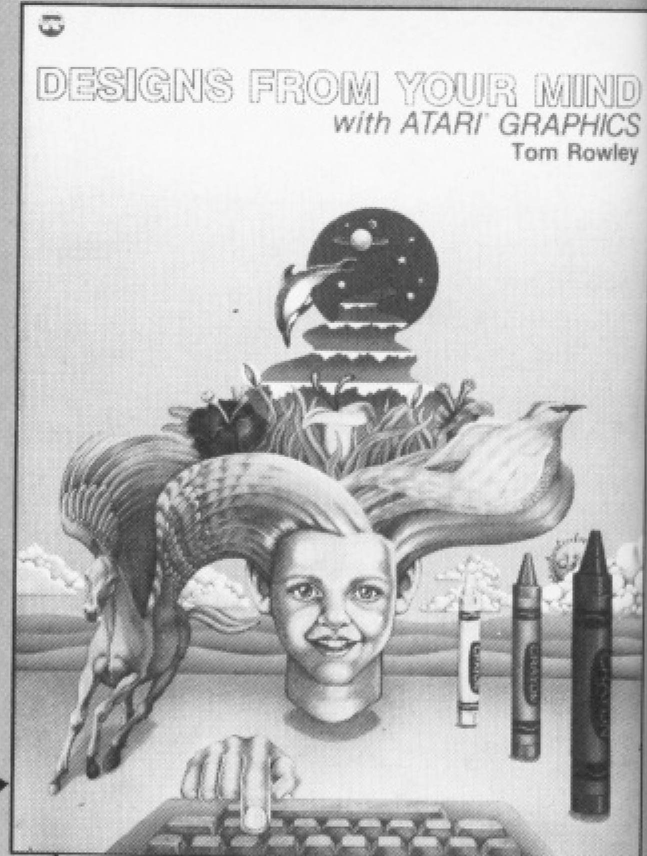


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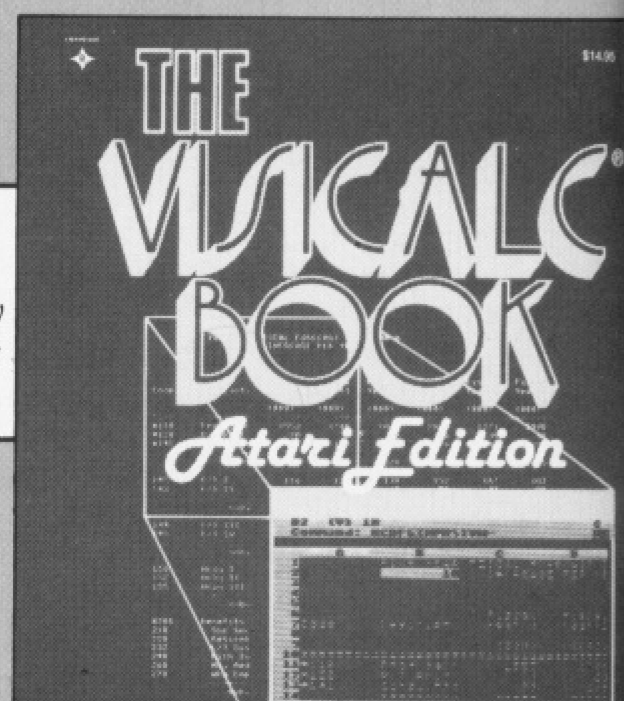
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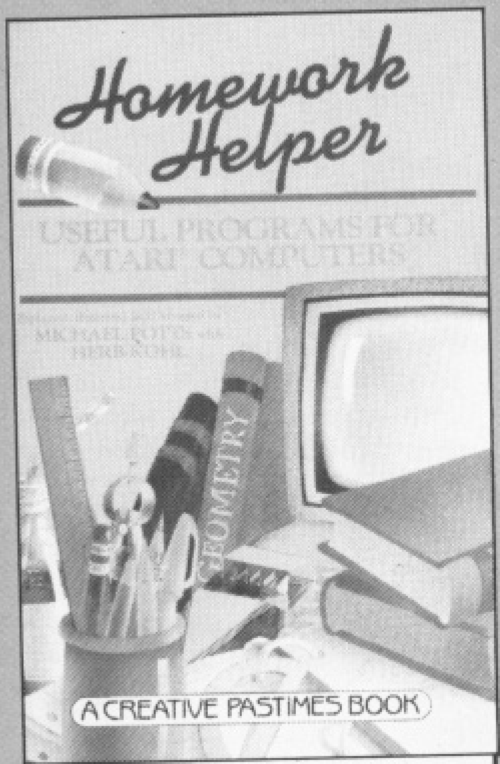
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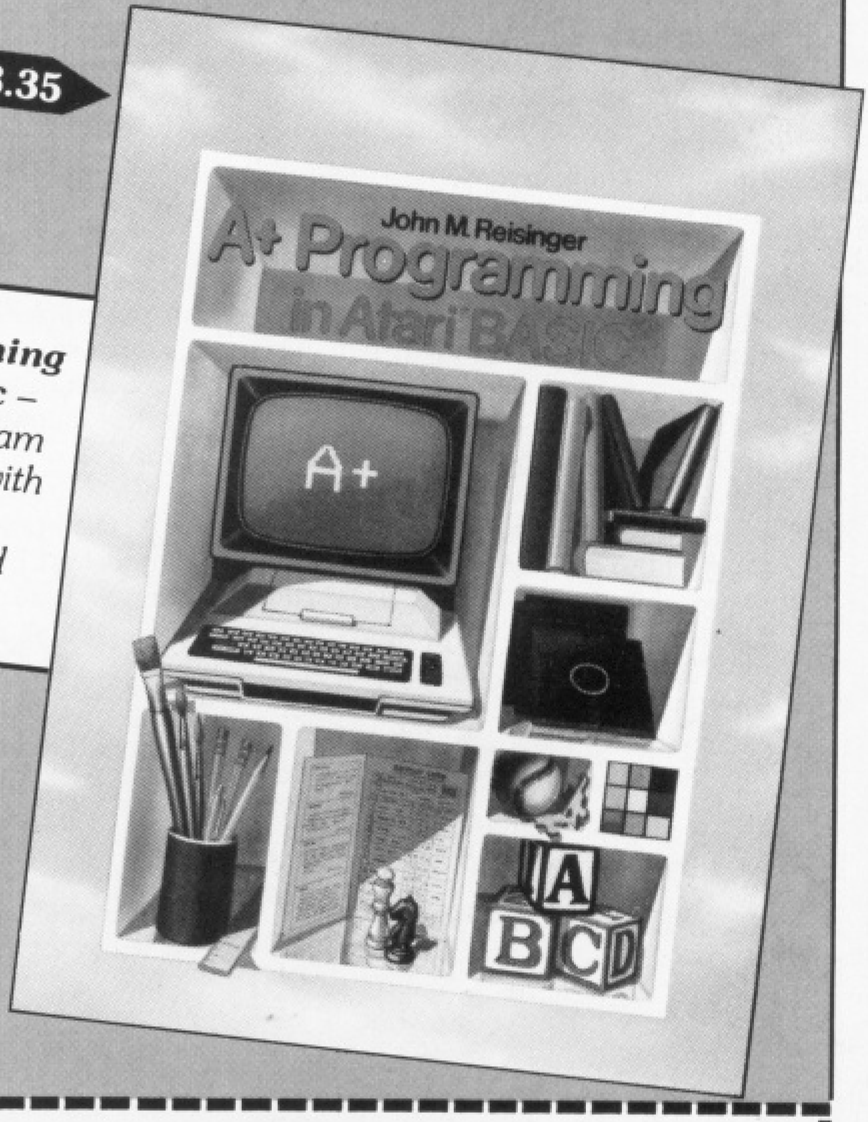
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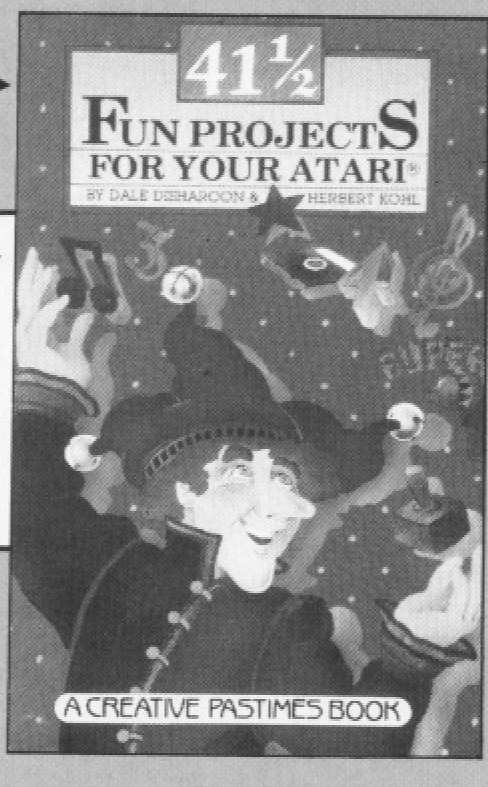
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Learning to spell can be fun when you load up the...

IF you have toddlers who are just starting to spell, the delight they show when you run this program will amply repay the effort of keying it in.

The idea is that you use a crane to pick up letters being carried by the Alphabet Train in order to spell the word displayed at the bottom of the screen.

Because the word is on-screen the whole time, even children who are not yet ready for spelling can gain important practice at shape matching.

Only a portion of the train shows at any one time, but the letters are arranged in alphabetical order. Moving the joystick from side to side or pressing either of the cursor arrow keys – the ← or → without using Shift or Control – moves the train across the screen.

Press the joystick button or the Space bar and the crane lifts up the letter, which it then deposits on a waiting dumper truck. It's possible to pick up an incorrect letter, but the efficient workers won't let it drop on to the truck.

Once the word has been built up, the truck rolls off to the word factory to the accompaniment of a merry tune.

Alphabet Train was written by Stan Ockers who contributed it to the Oregon ACE public domain library. We've made a couple of changes to the original, including the facility to use the keyboard instead of the joystick.

The words are held in the DATA statements of the subroutine which starts at line 1008 so it's not too difficult for you to include your own words of special significance to your children.

If you replace any of ours or add your own, make sure the number after the RND(0)* in line 1010 corresponds with the total number of words in the data statements. If the number is smaller than the number of words, the words on the end of the list will never get chosen.

More importantly, if the number is bigger than the number of words, the program may crash with an ERROR 6 – otherwise known as OUT OF DATA.

Also, don't include a word which has any letters repeated because the Alphabet Train only has one of each.

Alphabet Train has already become a firm favourite with our toddlers. If they play with it for much longer they'll never get the next issue of *Atari User* off to the printers!

PROGRAM STRUCTURE

142-149	Title screen.
159-272	Dimension strings and read DATA for various characters.
280-330	Initialise player missiles (PM).
350-390	Map uppercase alphabet letters A$, into PM area.
400-470	Map SCR$ onto screen.
480	Moves truck in from right.
490	Prints random word.
500-900	Main loop to control train and manipulate alphabet.
500-550	Test for stick or keypress then set direction of train.
560-610	Move train left or right, test for fire or space bar.
620-680	Pick up selected letter.
690-780	Drop if incorrect.
790-810	Word correct, move truck out.
820-900	Put correct letters back.
1020-1047	Data for words.

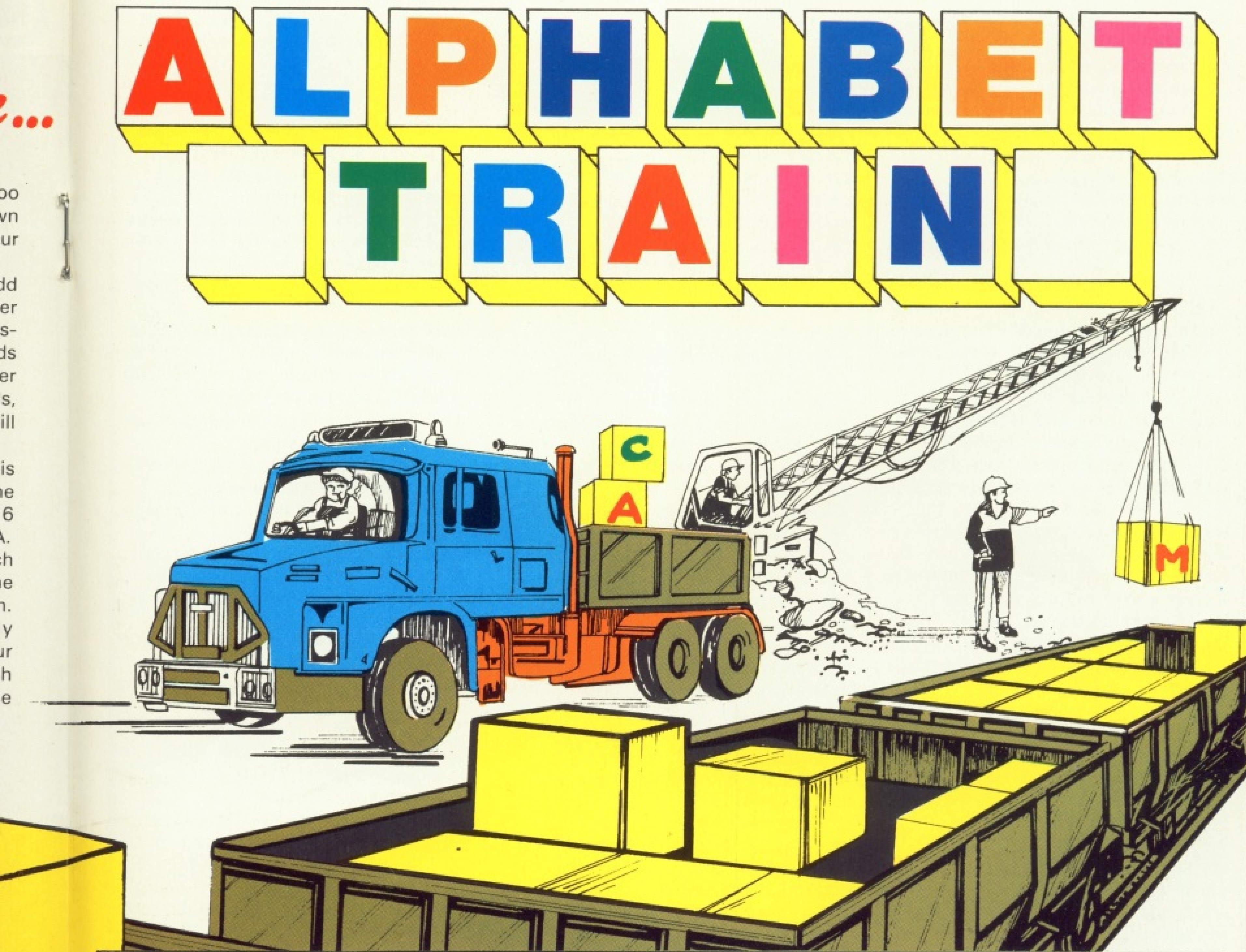
SUBROUTINES

910	Moves the character set.
1010	Picks a random word.
1050	Prints truck.
2040	Plays tune.

MAJOR VARIABLES

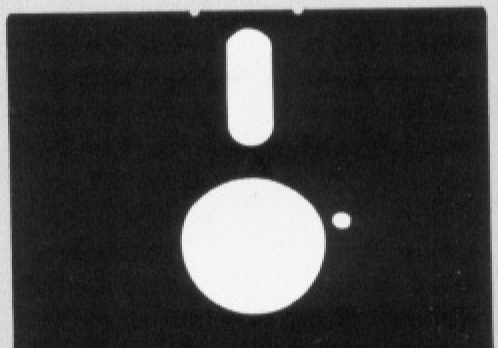
W$(6)	Random word from 100.
DIR	Relative change in direction of train.
PM	Player missile page address.
K	Keyboard status.
S	Joystick status.
SCR	Upper-left corner screen address.
TRN1$ TRN2$ TRN3$	Contain train's graphics
TRK1$ TRK2$ TRK3$	Contain truck's graphics.
VVTP	Points to variable value table.
X	X location of train.
XP	X position of PM2.
XR	X position of PM3.
OFFS HI LO	General memory pointers.






```
100 REM *****************************
110 REM *    Alphabet Train         *
120 REM *Atari Computer Enthusiasts*
130 REM *      Stan Ockers          *
140 REM *****************************
142 REM ** DEFINE STRINGS **
144 OPEN #1,4,0,"K:"
148 GRAPHICS 18:POSITION 4,4:PRINT #6;
"AlPhAbEt tRaIn":POSITION 4,5:PRINT #6
;"--------------"
149 POSITION 5,8:PRINT #6;"INITIALISIN
G"
159 DIM A$(1),SCR$(1),B$(12),TRN1$(180
),TRN2$(180),TRN3$(180),TRK1$(28),TRK2
$(28),TRK3$(28),W$(6)
160 DIM L$(10):L$(10)=CHR$(0):L$(1,1)=
CHR$(0):L$(2)=L$:DIM BL$(10):BL$=L$
170 DIM P$(8):RESTORE 180:FOR J=1 TO 8
:READ A:P$(J,J)=CHR$(A):NEXT J
180 DATA 1,3,7,255,255,7,3,1
190 DIM R$(8):RESTORE 200:FOR J=1 TO 8
:READ A:R$(J,J)=CHR$(A):NEXT J
200 DATA 128,192,224,255,255,224,192,1
28
210 RESTORE 220:FOR J=1 TO 12:READ A:B
$(J,J)=CHR$(A):NEXT J
220 DATA 24,36,66,129,129,129,129,129,
129,129,66,0
230 TRN1$(180)=" ":RESTORE 232:FOR J=1
 TO 24:READ A:TRN1$(J,J)=CHR$(A):NEXT
J:TRN1$(25)=TRN1$
232 DATA 77,84,84,0,84,84,205,212,212,
128,212,212,13,20,20,0,20,20,141,148,1
48,128,148,148
240 TRN2$(180)=" ":RESTORE 242:FOR J=1
 TO 24:READ A:TRN2$(J,J)=CHR$(A):NEXT
J:TRN2$(25)=TRN2$
242 DATA 0,32,32,32,32,32,0,96,96,96,9
6,96,0,160,160,160,160,160,0,224,224,2
24,224,224
250 TRN3$(180)=CHR$(0):TRN3$(1,1)=CHR$
(0):TRN3$(2)=TRN3$:FOR J=10 TO 160 STE
P 6:TRN3$(J,J)=CHR$(J/6+95):NEXT J
260 RESTORE 262:FOR J=1 TO 28:READ A:T
RK1$(J,J)=CHR$(A):NEXT J
262 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
,0,84,84,0,0,0,0,84,84,0,84,0,0
264 RESTORE 266:FOR J=1 TO 28:READ A:T
RK2$(J,J)=CHR$(A):NEXT J
266 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
,224,224,224,224,224,224,224,21,32,32,
32,32,0,
270 RESTORE 272:FOR J=1 TO 28:READ A:T
RK3$(J,J)=CHR$(A):NEXT J
272 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,0,32,13,22,0,0,
278 REM ** SET ASIDE PM AREA **
280 GRAPHICS 7:POKE 106,PEEK(106)-5:PM
=PEEK(106)+1:POKE 54279,PM:GRAPHICS 18
:GOSUB 910
290 RESTORE 300:FOR J=704 TO 712:READ
A:POKE J,A:NEXT J
300 DATA 32,255,18,82,50,255,34,52,57
310 POSITION 5,1:PRINT #6;CHR$(142);CH
R$(142);CHR$(142):POSITION 6,6:PRINT #
```

```
6;"--------------"
320 POSITION 0,10:FOR I=1 TO 20:PRINT
#6;CHR$(171);:NEXT I
330 POKE 559,46:POKE 53277,3
340 REM ** MAP A$ ONTO PM AREA **
350 VVTP=PEEK(134)+PEEK(135)*256:STARP
=ADR(A$)
380 OFFS=PM*256+512-STARP:HI=INT(OFFS/
256):LO=OFFS-HI*256
390 POKE VVTP+2,LO:POKE VVTP+3,HI:POKE
 VVTP+5,2:POKE VVTP+6,0:POKE VVTP+7,2
392 REM ** MAP SCR$ ONTO SCREEN AREA *
*
400 SCR=PEEK(88)+256*PEEK(89):OFFS=SCR
-STARP:HI=INT(OFFS/256):LO=OFFS-HI*256
420 POKE VVTP+10,LO:POKE VVTP+11,HI
430 POKE VVTP+12,5:POKE VVTP+13,1:POKE
 VVTP+14,5:POKE VVTP+15,1
440 Y=60:Z=80:X=50
450 A$(Y,Y+11)=B$:POKE 53248,Z:FOR J=1
 TO 59:A$(J,J)=CHR$(24):NEXT J
460 A$(280,287)=P$:XP=64:POKE 53250,XP
470 A$(408,415)=R$:XR=158:POKE 53251,X
R
478 REM ** TRUCK COMES IN FROM RIGHT *
*
480 FOR J=1 TO 15:XT=J:GOSUB 1050:SOUN
D 0,100,4,XT/2:FOR K=1 TO 20:NEXT K:NE
XT J:POKE 77,0:POKE 764,255
488 REM ** PRINT WORD **
490 GOSUB 1010:POSITION 10-LEN(W$)/2,1
1:PRINT #6;W$
491 REM ** LOOP TO MOVE TRAIN **
500 S=STICK(0):K=PEEK(764):IF S=7 OR K
=7 AND X>6 THEN X=X-1:DIR=-1:POKE 764,
255
510 IF S=11 OR K=6 AND X<156 THEN X=X+
1:DIR=1:POKE 764,255
520 IF S<15 THEN 560
530 IF INT(X/6)=X/6 THEN 560
540 IF DIR=-1 THEN X=X-1
550 IF DIR=1 THEN X=X+1
558 REM ** MOVE TRAIN **
560 SCR$(181,200)=TRN1$(X,X+19)
570 SCR$(161,180)=TRN2$(X,X+19)
578 REM ** SOUND IF TRAIN COMING **
580 SCR$(141,160)=TRN3$(X,X+19)
590 IF X=SX THEN SOUND 0,0,0,0
600 IF X<>SX THEN SOUND 0,100,4,6:SX=X
610 IF STRIG(0)=1 AND K<>33 THEN 500
618 REM ** PICK UP LETTER **
620 C=ASC(TRN3$(X+4)):IF C=0 THEN 500
630 FOR J=1 TO 11:Y=Y+1:A$(Y,Y+11)=B$:
SOUND 0,(Y+100)*(Y/3=INT(Y/3)),10,6:FO
R K=1 TO 20:NEXT K:NEXT J
640 CS=57344+256+8*X/6:FOR J=1 TO 8:L$
(J+1,J+1)=CHR$(PEEK(CS+J-1)):NEXT J
650 A$(129+Y,139+Y)=L$:POKE 53249,Z
660 P=4+X:TRN3$(P,P)=CHR$(0):SCR$(141,
160)=TRN3$(X,X+19)
670 FOR J=1 TO 50:Y=Y-1:A$(Y,Y+11)=B$:
A$(129+Y,139+Y)=L$:SOUND 0,(Y+100)*(Y/
3=INT(Y/3)),10,6:FOR K=1 TO 10
680 NEXT K:NEXT J:SOUND 0,0,0,0:FOR J=
1 TO 8:XP=XP+1:POKE 53250,XP:NEXT J
688 REM ** IF LETTER NOT CORRECT DROP
IT **
690 IF C-32<>ASC(W$(LTR+1)) THEN GOSUB
 820
700 FOR J=1 TO 32+8*LTR:Z=Z+1:XP=XP+1:
POKE 53250,XP:POKE 53249,Z
710 SOUND 0,Y+100*(XP/3=INT(XP/3)),10,
6:NEXT J:LTR=LTR+1
720 FOR J=1 TO 15:Y=Y+1:A$(129+Y,139+Y
)=L$:SOUND 0,Y+100,10,6:NEXT J:A$(129+
Y,139+Y)=BL$
730 P=16+LTR:TRK3$(P,P)=CHR$(X/6+96):S
CR$(67,80)=TRK3$(XT,XT+13):POSITION (Z
-48)/8,1:PRINT #6;CHR$(142)
740 FOR J=1 TO 30:SOUND 0,100+100*RND(
0),8,(30-J)/3:NEXT J
750 XP=XP-1:POKE 53250,XP:SOUND 0,Y+10
0*(XP/3=INT(XP/3)),10,6:IF XP>64 THEN
750
760 Z=80:POKE 53249,Z:Y=Y-15
770 FOR J=1 TO 39:Y=Y+1:A$(Y,Y+11)=B$:
SOUND 0,Y+100,10,6:NEXT J
780 SOUND 0,0,0,0:IF LTR<LEN(W$) THEN
POKE 764,255:GOTO 500
788 REM ** WORD CORRECT - MOVE TRUCK O
UT **
790 FOR J=15 TO 1 STEP -1:XT=J:GOSUB 1
050:SOUND 0,100,4,XT/2:FOR K=1 TO 20:N
EXT K:NEXT J
795 GOSUB 2040
800 POSITION 7,11:PRINT #6;"      ":FO
R J=10 TO 160 STEP 6:TRN3$(J,J)=CHR$(J
/6+95):NEXT J
810 LTR=0:FOR J=17 TO 22:TRK3$(J,J)=CH
R$(0):NEXT J:POSITION 8,1:PRINT #6;"
    ":GOTO 480
818 REM ** ROUTINE FOR PUTTING INCORRE
CT LETTER BACK **
820 FOR J=1 TO 14:SOUND 0,50+50*(XP/3=
INT(XP/3)),10,6
830 Z=Z+1:XP=XP+1:XR=XR-4:POKE 53249,Z
:POKE 53250,XP:POKE 53251,XR:NEXT J:SO
UND 0,0,0,0
840 FOR J=1 TO 14:Z=Z-1:XP=XP-1:XR=XR-
1:POKE 53249,Z:POKE 53250,XP:POKE 5325
1,XR:NEXT J
850 FOR J=1 TO 8:XP=XP-1:XR=XR+2:POKE
53250,XP:POKE 53251,XR:Y=Y+1:A$(129+Y,
139+Y)=L$:A$(Y,Y+11)=B$:NEXT J
860 FOR J=1 TO 27:XR=XR+2:POKE 53251,X
R:Y=Y+1:A$(129+Y,139+Y)=L$:A$(Y,Y+11)=
B$:SOUND 0,Y+100,10,8:NEXT J
870 FOR J=1 TO 15:SOUND 0,Y+100,10,8:Y
=Y+1:A$(Y,Y+11)=B$:A$(129+Y,139+Y)=L$:
NEXT J:TRN3$(P,P)=CHR$(C)
880 FOR J=1 TO 30:SOUND 0,100+100*RND(
0),8,(30-J)/3:NEXT J
890 SCR$(141,160)=TRN3$(X,X+19):A$(129
+Y,139+Y)=BL$:FOR J=1 TO 11:Y=Y-1:A$(Y
,Y+11)=B$:NEXT J
900 SOUND 0,0,0,0:POKE 764,255:GOTO 50
0
908 REM ** MACHINE LEVEL - MOVE CHARAC
TER SET **
910 POKE 756,PM
920 DIM MV$(23):RESTORE 930:FOR J=1 TO
 23:READ A:MV$(J,J)=CHR$(A):NEXT J
930 DATA 104,104,133,204,104,133,203,1
04,133,206,104,133,205,160,0,177,203,1
45,205,136,208,249,96
940 CS=57344+512:NCS=PM*256:A=USR(ADR(
MV$),CS,NCS)
950 FOR J=NCS TO NCS+7:POKE J,0:NEXT J
960 CS=57344+256:NCS=PM*256+256:A=USR(
ADR(MV$),CS,NCS)
970 FOR J=NCS TO NCS+7:POKE J,255:NEXT
 J
980 NCS=PM*256:RESTORE 990:FOR J=160 T
O 167:READ A:POKE NCS+J,A:NEXT J
990 DATA 0,0,60,102,219,219,102,60
1000 POKE 756,PM:RETURN
1008 REM ** PICK A WORD SUBROUTINE **
1010 RESTORE 1020:FOR J=1 TO INT(RND(0
)*100)+1:READ W$:NEXT J:RETURN
1020 DATA DOG,CAT,BIRD,HAND,COW,HORSE,
PET,FROG,FLY,ARM
1030 DATA HAIR,TOE,FINGER,LEG,FACE,EAR
,MOUTH,BAT,WORK,PLAY
1040 DATA WAGON,BIKE,CAR,VAN,TYRE,CHAI
N,BRAKE,GEAR,HORN,PEDAL
1041 DATA BAT,WICKET,PITCH,BAIL,NET,CL
UB,SCORE,WIN,BOWL,BOUNCE
1042 DATA TEA,MILK,SUGAR,SAUCE,GRAVY,W
ATER,SPICE,HONEY,FRUIT,CAKE
1043 DATA SUN,RAIN,WIND,CLOUD,SHINE,SN
OW,HAIL,ICE,FROST,SHOWER
1044 DATA FLOWER,ROSE,ROCK,THORN,BUSH,
STONE,LEAF,PETAL,BRANCH,BARK
1045 DATA RAT,MOUSE,CAMEL,LION,DOG,CAT
,HORSE,PIG,TIGER,COW
1046 DATA ONE,TWO,FOUR,FIVE,SIX,EIGHT,
TEN,FORTY,ZERO,HALF
1047 DATA HAT,COAT,BELT,SHIRT,VEST,BLO
USE,SHOE,SOCK,JUMPER,TIE
1048 REM ** PRINT TRUCK SUBROUTINE **
1050 SCR$(107,120)=TRK1$(XT,XT+13):SCR
$(87,100)=TRK2$(XT,XT+13):SCR$(67,80)=
TRK3$(XT,XT+13):RETURN
2030 REM ** TUNE SUBROUTINE **
2032 DATA 91,6,121,1,91,2,121,1,91,2,8
1,1,72,8,91,8,68,6,68,1,91,4,81,4,72,8
,0,4
2034 DATA 91,6,121,1,91,2,121,1,91,2,8
1,1,72,8,91,4,72,2,72,1,72,4,81,4,81,4
,72,4,81,8
2040 RESTORE 2032:FOR J=1 TO 29:READ P
,T:IF P=0 THEN FOR K=1 TO 20*T:NEXT K:
GOTO 2070
2050 SOUND 0,P,10,8:SOUND 1,2*P,10,6:F
OR L=1 TO 12*T
2060 NEXT L:SOUND 0,0,0,0:SOUND 1,0,0,
0
2070 NEXT J:RETURN
```



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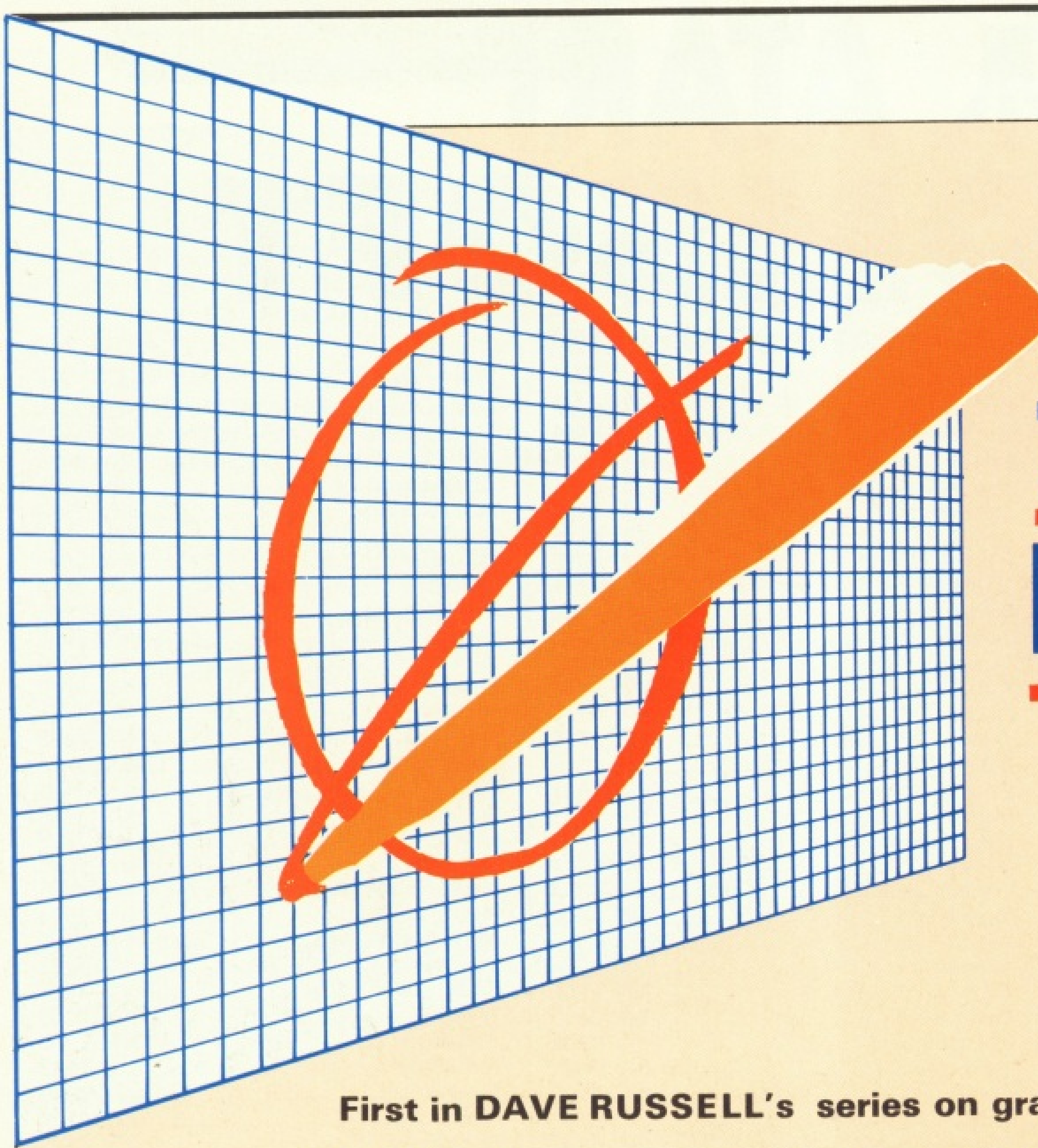
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Get in the right Mode for screen displays

First in DAVE RUSSELL's series on graphics modes

IN this series we'll be looking at the Atari's various graphics modes and seeing what each is capable of displaying.

You may have read some of this information before, or you may have discovered some of it by accident. If you think you've found something that nobody else knows, write and share it with your fellow readers.

If we're going to look at the Atari's graphics modes, we might as well start as the machine itself does – with Mode 0.

This is the *default* mode, the one which appears when the machine is switched on and no program is present. It's a large blue rectangle with a black border, and text appears on it in light blue.

Although Mode 0 is one of the *graphics* modes and is invoked by the command GRAPHICS 0 (or GR.0), it is more usually thought of as a text mode. It is used mostly for entering and displaying the letters and numbers which make up text, although it does have some 'graphic' capabilities as we'll see later in this series.

The blue rectangle can be thought of as the piece of paper on which you write your text. Unlike ordinary paper, though, you can't write freely across the screen.

In fact, it's more like graph paper, divided up into little boxes. Many forms that we have to fill in these days have rows of boxes where you write your information, and usually there is an instruction to write only one character in each box.

A text screen is like that, and Mode 0 has 24 rows of boxes, with 40 boxes in each row. However, you may have noticed that the word READY doesn't appear at the leftmost edge of the screen.

Unless you do something to alter it, the default setting is for only 38 characters in a row. The 'missing' two characters form a margin down the left hand side of the screen.

```
10 FOR A=1 TO 4
20 PRINT "1234567890";
30 NEXT A
```

Listing I

```
10 GRAPHICS 0
20 FOR A=0 TO 15
30 SETCOLOR 2,A,8
40 FOR DELAY=1 TO 300:NEXT DELAY
50 NEXT A
60 GRAPHICS 0
```

Listing II

If you want to count the boxes on a row, type the numbers 1234567890 repeatedly. As you type the fourth 8 the cursor moves to the beginning of the next row.

Alternatively, type in Listing I and Run it. This will print the numbers for you, and we'll use it again in a few moments.

It's quite easy to give yourself the full 40 characters. The size of the left margin is held in memory location 82 and you can see how big it is normally by typing:

PRINT PEEK(82)

and pressing Return. This should print the value 2 on the screen.

We can alter the contents of a memory location using the POKE command, as long as we specify what number to enter there. So if you type:

POKE 82,0

and press Return, the word READY will appear at the very edge of the screen.

If you entered Listing I, it should still be in memory unless you've since typed New. Run the program again, and this time the 40 numbers will fit neatly across the screen.

We can work the same magic on

the right hand margin using memory location 83. If you enter:

PRINT PEEK(83)

this will usually return the value 39, indicating the rightmost column. Remember, counting starts at 0, which is why location 83 doesn't contain the value 40.

If you enter:

POKE 83,10

and press Return, this will set the righthand margin to column 10. Assuming that location 82 still holds the value 0 that you Poked in earlier, the effect of this poke to location 83 is to give you a screen which is effectively only 11 columns wide.

The blue rectangle stays the same size – it's just that you can't type on so much of it now. To see the effect, try running Listing I again.

If you've been playing about with locations 82 and 83 and want to get back to the default values, you can always press the Reset key. This will (literally!) re-set the values without losing any program you had in memory.

Before leaving the text aspect of Mode 0, try:

POKE 755,4

Normal service can be resumed as soon as you return location 755 to its more usual value of 2 – or press Reset if you find it hard to type in Outback Mode!

The Atari has several registers which hold information about various things. Five of these contain information on colours. They are numbered from 0 to 4, and colour register 2 holds the colour in which the Mode 0 screen appears.

We could POKE particular locations to change the colour, but Atari Basic offers us a more elegant method – the SETCOLOR command.

To use this command we need to know three things: the register number which we want to affect, the colour number which we want to put there, and how bright we want the colour to be.

These three parameters must follow the command in the order in which I've given them.

The default colour for register 2 is colour 9, the blue you know and love. To change this colour, all we need to do is key in:

SETCOLOR 2,4,4

If you've just entered this, your screen is now aglow with colour 4, or pink as we call it. If you want to get rid of colour altogether, try:

SETCOLOR 2,0,0

This produces a very dark grey and the Mode 0 screen blends with the border to give the effect of a much larger screen. Of course, text can still only be entered in the area which is usually coloured.

If you enter Listing II and Run it, you'll see the screen cycle through the range of 16 colours available before returning you to the default colour. Notice that because Listing II uses the same line numbers as Listing I, it will overwrite it in memory.

Only the second parameter, the one controlling the screen colour, is varied. The luminance remains at value 8 for each colour displayed.

Incidentally, the purpose of line 40 is simply to keep each colour on the screen long enough for you to see it. If you remove line 40 and run the program your screen will appear to flash as the colours are displayed at very high speed.

‘Thank Atari for a decent reset function which many other micro owners would envy’

The colour information for the Mode 0 border is held in register 4 and we can alter this in the same way as the text screen. Enter:

SETCOLOR 2,0,0

and you will have a completely black screen. Now try entering:

SETCOLOR 4,9,4

This alters the register controlling the border colour so that it now contains colour 9 – the colour we usually associate with the text portion of the Mode 0 screen.

Well, we've had upside-down text so we might as well have the usual colour relationships reversed too! Reset will restore the registers to their default values . . . or maybe you prefer having white text on a black background.

We can make the border cycle through the available colours by simply changing line 30 in Listing II to read:

30 SETCOLOR 4,A,8

That is, by changing the colour in register 4, we alter the border colour rather than the screen colour.

The brightness of the letters on the screen is controlled by the contents of register 1. However the colour of the letters is always the same as the colour of the text screen.

If we set the luminance parameter of register 1 to a bigger number than the luminance parameter of register 2, then we (probably) get ‘light’ text on a ‘dark’ background.

If we set register 1's luminance to a smaller number than register 2's, we (probably) get ‘dark’ text on a ‘light’ background.

To see this effect, press Reset and then enter:

SETCOLOR 2,1,8

This produces a gold screen with paler text. If you now enter:

SETCOLOR 1,1,4

the screen stays the same but the text changes to a darker colour.

So why use the word ‘probably’? The luminance parameter can range from 0 to 14, but only even numbers are valid. If you enter an odd number, the luminance is set to the number you entered minus 1.

This means that if you set register 1's luminance to 9 and register 2's luminance to 8, then *both* are effectively set to 8.

If you change line 30 in Listing II to read:

30 SETCOLOR 1,1,A

and run the program you'll see the text cycle through the luminance values. Strictly speaking you should change line 20 to read:

20 FOR A=0 TO 14 STEP 2

but it won't do any harm if you don't bother. Each luminance will be displayed for twice as long as each colour was displayed previously.

For the final disappearing act, enter:

SETCOLOR 1,1,4

Assuming you were back in the blue, the luminance in register 1 is now the same as that in register 2. This means that the text is now displayed at the same brightness as the background.

Unfortunately, the practical effect of this is that the text is rendered invisible. Unless you enjoy flying blind, press Reset once again.

And while you're pressing it, say a quiet ‘thank you’ to Atari for a decent reset function which many other micro owners would envy.

HEXER



It sounds like the Black Arts . . . and you'll find something magical about KEVIN EDWARDS' helpful utility for displaying and executing machine code routines . . .

HEXER is a hexadecimal loader. It is a very useful utility that allows you to enter, display and execute machine code routines.

Once the program is RUN, a menu will be displayed with five options. They are:

```
1. Enter code
2. Examine code
3. Alter code
4. Run code
5. End program
```

The choice is now up to you. To select one of the options press the corresponding number key.

Option 1 allows you to enter a series of hexadecimal bytes into memory. The first question you'll be asked is:

```
Start address?
```

You should now enter the address where your routine begins in hexadecimal without the $ sign – this is true for all hex numbers entered.

A default address ($4000) will be selected if you press Return without an address or enter a hex number greater than $FFFF.

$4000 is a safe area of memory and should be used to accommodate your first experimental programs.

After the start address has been entered you will be prompted with:

```
byte?
```

Here the program is asking you for the hexadecimal number that you want to store in memory, starting at the address you've just selected.

Now you can begin entering your program, one byte at a time, pressing Return after each byte.

After each number is entered the 'byte?' prompt is repeated, indicating that the previous byte has been entered into memory and that the memory address has been incremented by one. The program is now ready to accept another byte.

When you've entered your program you can exit by entering S in response to the byte? prompt. This will return you to the menu.

If you enter an invalid hex number – such as 40G1, where G is not a hex digit – the message 'Invalid HEX !' will be displayed. After which you will be returned to the menu.

Option 2 allows you to examine memory eight bytes at a time.

Again, the first question you will be asked is: 'Start address?'.

If you simply press Return it will default to $3FF8.

Let's assume that we've entered 4000. A row of eight bytes will be displayed. Here is a possible output:

```
4000 A9 20 8D 20 40 68 60 00
```

The four digit hex number corresponds to the memory address of the first byte in the row – the A9. The next byte in the row, 20, is the contents of location $4001. And from this I'm sure that you can see that $4002 contains 8D, $4003 contains 20 and so on.

If you wish to see another row of bytes press any key other than S, as S returns you back to the menu.

Option 3 works in a similar way as Option 1. The difference being that the memory location being altered is displayed along with its contents.

As with Option 1 the prompt 'byte?' indicates that the program is ready for a byte. Now you can begin entering numbers in the same way as Option 1.

Option 4 allows you to execute one of your own programs.

Again, a start address will be requested. This is the address that will be executed.

Since this option can prove deadly a further prompt will ask you if you are

sure that you want to execute the program at the address entered.

Pressing any key other than Y aborts the option and returns to the menu.

If your reply is Y, the message 'In M/C routine' is displayed. Your routine is then called.

If the program returns successfully the message 'Out of M/C routine' will be displayed. After which the menu is re-displayed.

If for some reason the second message doesn't occur and your micro appears to have 'locked up' your routine has failed.

Almost certainly the cause of this is a byte left on the 6502 stack, thus upsetting the return address of the program. If you're wondering how the byte got there in the first place the answer is given by the Basic ROM.

Hexer uses the command USR to call the machine code routine. The syntax of USR is:

```
X=USR(address,b1,b2...bn)
```

There is an option to pass data to the routine by additional parameters (b1, b2 . . . bn). These parameters are pushed onto the stack in the order bn . . . b2, b1.

Therefore, the number at the top of the stack is b1 and the last is bn – the

```
10 REM HEXER
20 REM (C) ATARI USER
30 REM
40 GRAPHICS 0
50 DIM A$(10),NUMB$(10)
60 OPEN #1,4,0,"K:"
100 ? :? "You may:-":?
110 ? "1. Enter code"
120 ? "2. Examine code"
130 ? "3. Alter code"
140 ? "4. Run code"
150 ? "5. End program"
160 ?
170 GET #1,A
180 IF A<ASC("1") OR A>ASC("5") THEN G
OTO 170
190 ? CHR$(A):A=A-48:DFLAG=0
200 ON A GOSUB 300,400,600,800,220
210 GOTO 100
220 CLOSE #1:END
300 ? "Start Address";
310 INPUT A$
320 GOSUB 1000:START=RES
330 PRINT "byte ";:INPUT NUMB$
340 IF NUMB$="S" OR NUMB$="" OR LEN(NU
MB$)>2 THEN ? "Terminated":RETURN
350 A$=NUMB$:GOSUB 1000
360 IF RES>255 THEN ? :? "Terminated":
RETURN
370 POKE START,RES
380 START=START+1:GOTO 330
400 ? "Start Address";
410 INPUT A$:DFLAG=1
420 GOSUB 1000:START=RES
430 A=INT(START/256):GOSUB 2000
440 A=START:GOSUB 2000
450 FOR LOOP=0 TO 7
460 ? ;" ";
470 A=PEEK(START+LOOP):GOSUB 2000
480 NEXT LOOP:?
490 START=START+8
500 GET #1,A
510 IF A<>ASC("S") THEN GOTO 430
520 RETURN
600 ? "Start Address";
610 INPUT A$
620 GOSUB 1000:START=RES
630 A=INT(START/256):GOSUB 2000
640 A=START:GOSUB 2000
645 ? ;" ";
650 A=PEEK(START):GOSUB 2000
660 ? ;"  byte ";:INPUT NUMB$
670 IF NUMB$="S" OR NUMB$="" OR LEN(NU
MB$)>2 THEN ? "Terminated":RETURN
680 A$=NUMB$:GOSUB 1000
690 IF RES>255 THEN ? :? "Terminated":
RETURN
700 POKE START,RES
710 START=START+1
720 GOTO 630
800 ? "Start Address";
810 INPUT A$
820 GOSUB 1000
830 ? :? "Are you sure (Y/N) ?"
840 GET #1,A
850 IF A<>ASC("Y") THEN ? :? "Aborted"
:RETURN
860 ? :? "In M/C routine"
870 START=RES:A=USR(START)
880 ? :? "Out of M/C routine"
890 RETURN
1000 REM EVALUATE A HEX NUMBER
1010 IF A$="" AND DFLAG=0 THEN RES=163
84:? :? "Start =$4000":? :GOTO 1110
1015 IF A$="" AND DFLAG=1 THEN RES=163
76:? :? "Start =$3FF8":? :GOTO 1110
1020 IF LEN(A$)>4 THEN ? :? "Too many
digits":A$="":GOTO 1000
1030 RES=0:FOR L=1 TO LEN(A$)
1040 NUM=ASC(A$(L,L))
1050 IF NUM<48 OR NUM>70 THEN GOTO 108
0
1060 IF NUM<58 THEN NUM=NUM-48:GOTO 10
90
1070 IF NUM>64 THEN NUM=NUM-55:GOTO 10
90
1080 PRINT :PRINT "Invalid HEX !":POP
:POP :RETURN
1090 RES=RES+(NUM*(16^(LEN(A$)-L)))
1100 NEXT L
1110 RETURN
2000 A=((A/256)-INT(A/256))*256
2010 SAFE=A:A=INT(A/16):GOSUB 2040:A=S
AFE
2020 IF A>15 THEN A=A-16:GOTO 2020
2030 GOSUB 2040:RETURN
2040 IF A<9.5 THEN A=A+48:GOTO 2060
2050 A=A+55
2060 PRINT ;CHR$(A);
2070 RETURN
```

VARIABLES USED IN HEXER

A$	Contains the hex number which is to be evaluated by the routine at line 1000.
NUMB$	Contains the hex byte which is to be entered into memory.
A	General purpose variable.
DFLAG	A flag indicating whether or not the examine mode is in operation. 1=yes, 0=no. This is used to change the default address to $3FF8 instead of $4000 when return is pressed in response to the Start address prompt.
L,LOOP	General loop variables.
NUM	Ascii code of the hex digit being evaluated.
RES	Result of the hex conversion.
START	Current memory address being accessed.

low byte of the parameter is pushed before the high byte. And below all of these bytes is the return address of the routine.

The naughty thing about USR is that an additional byte containing the number of parameters passed is pushed onto the stack just before the routine is jumped to, even if no parameters are specified (when it contains 0).

Thus, even though you've pulled your parameters from the stack when the ReTurn from Subroutine (RTS – $60) is executed, the return address is incorrect and the 6502 jumps to the wrong area of memory.

The remedy to this is to pull a byte off the stack with PLA before executing the RTS – to remove the offending byte.

So the end of all your routines should have the following two bytes:

```
68  -  PLA (remove the extra byte)
60  -  RTS (return back to hexer)
```

Without these bytes your programs will almost certainly hang up.

Option 5 allows you to exit from Hexer.

And that completes the description of Hexer's commands. Now we'll have a look at the program itself.

The problem with Atari Basic is that it has no command to evaluate or print hexadecimal numbers.

The subroutine starting at line 1000 and ending at 1110 evaluates a hexadecimal number held in the variable A$ and returns with the result in the variable RES.

For example, if A$="C" and the routine is called, the variable RES will contain 12 on exit.

If you remember, pressing Return without entering a hex number causes the program to default to location $4000. Line 1010 of the subroutine is responsible for this. If the string A$ contains nothing ("") RES is set to 16384 ($4000) and the routine is exited.

Another check the routine performs is to see if the hex number has more than four digits. If it has the routine nulls A$ and jumps to line 1010, which in turn sets RES to 16384 and exits. This is done because the 6502 micro-processor can only address location 0 to $FFFF.

character and	ASCII code	result after subtract
0	48	0
1	49	1
2	50	2
3	51	3
4	52	4
5	53	5
6	54	6
7	55	7
8	56	8
9	57	9
A	65	10
B	66	11
C	67	12
D	68	13
E	69	14
F	70	15

Table I

Now the number must be validated. This is done by scanning through each character in the string checking to see if it is a valid hex digit (0-9, A-F).

If an invalid hex digit is found a message is displayed indicating so. The FOR TO loop and GOSUB address are then POPped off the Basic stack and the routine RETURNs to the menu – see line 1080.

As each character is accepted a number is subtracted from its Ascii code. The number depends upon the character.

If it is a numeric character, 0-9 (Ascii codes 48 to 57), 48 is subtracted – to get a result in the range 0-9. If it's an alphanumeric character, A-F (Ascii codes 65 to 70), 55 is subtracted – to get a result in the range 10-15.

All this does is change Ascii characters 0-9 and A-F into their corresponding numeric values. See Table I.

The result of this is then multiplied by 16 to the power of the LENgth of the string, A$, minus the actual position, minus 1 – the most significant digit is at the start of the string and not the end.

Have a look at Diagram I.

```
16^3   16^2  16^1  16^0
4096s  256s  16s   1s
----------------------
  1     3     C     2   (decimal)

  1     3    12     2   (hex)
```

Diagram I

So from the diagram you can see that $13C2= (1*4096) + (3*256) + (12*16) + (2*1).

This is exactly what the program does with the hex digits in A$.

On exit from the routine RES has the result.

The other important routine outputs a byte in hexadecimal – lines 2000-2070.

On entry, the variable A contains the number to be printed. This is split into two nybbles (two 4 bit numbers). The top four bits of A make one nybble (the upper nybble) and the lower 4 bits make the other (the lower nybble).

Splitting the byte in this way allows us to print two hex digits because each nybble directly corresponds to a hexadecimal digit.

Now all we have to do is print the Ascii character that corresponds to each nybble.

If the nybble is between 0 and 9 we add 48 to it to get an Ascii character 0-9. If the nybble is between 10 and 15 we add 55 to it to get an Ascii character A-F. This is all done by another subroutine which starts at line 2040.

Line 2010 extracts the upper nybble from A and prints it. The same is done in line 2020 and 2030 for the lower nybble.

The main body of the program is responsible for prompts and simple validation.

If you're wondering what line 60 in the program does the simple answer is it OPENs a keyboard file for input. This is done to allow us to wait for a key depression by issuing a GET#1,A command. After which the variable A holds the Ascii code of the key pressed.

Anyway, it's time for you to try out your own programs using Hexer.

Happy Coding!

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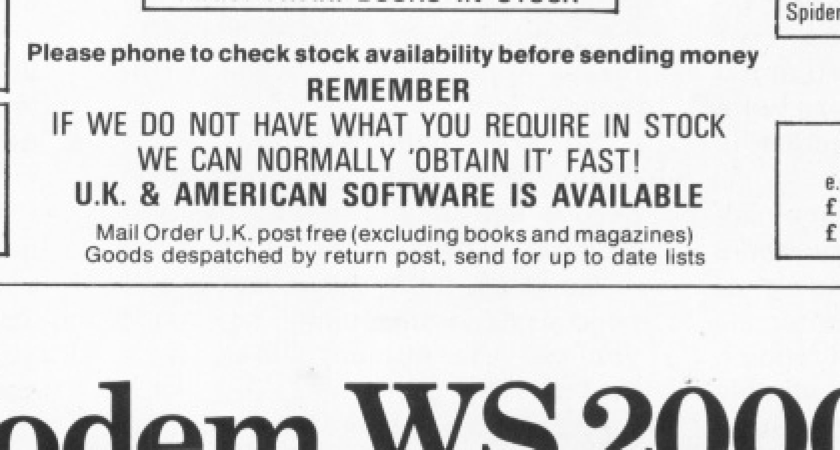
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It all adds up to binary code

Part One of MIKE BIBBY's easy-to-follow series looks at the number system at the heart of your Atari

WELCOME to the first in a series of articles in which we hope to take the mystery out of understånding the fundamentals of the Atari's workings.

All too often even competent Basic programmers tend to shy off such topics as binary coding, hexadecimal and assembly language because it seems too "mathematical".

This is a great pity, because the Atari is so constructed that a little knowledge in these fields allows you to take full advantage of its advanced facilities.

The mathematical aspects of the subject aren't at all deep – certainly anyone who can follow Basic should be able to cope with this series.

If you feel that despite our best efforts we still haven't explained something fully enough, please write in and tell us – we'll try to rectify the situation in later articles.

First we are going to look at binary code – a way of handling numbers essential to our understanding of what goes on inside a computer.

Binary is just a way of coding numbers in a way particularly suitable for computers. It's actually quite simple. What often confuses beginners is the fact that the binary system codes numbers in a way that can look extremely like the way we normally code numbers.

For example, if you were presented with a number 100, you would probably decode it in your normal way and say it was "one hundred".

That, however, is just one way of interpreting it. If you decided to decode it as a binary number, you would interpret 100 in a completely different way and say it meant the number "four." *(Never mind exactly how you arrived at that conclusion for the moment.)*

This is what often causes problems – people are so used to dealing with their numbers in the normal way that 100 is always "one hundred" to them, and they can't make the shift necessary to decode it in binary as "four".

Actually it is rather ambiguous. Presented with 100, do you interpret it as "one hundred" or "four"? Our rule will be, if you mean our usual way of dealing with numbers *(the hundreds, tens and units you learnt at school – or put it more formally, the denary system)* you write the number in the normal way.

If you wish the number to be decoded as a binary number you put the symbol % in front of it – 100 means "one hundred" while %100 means "four".

So far so good. We now have a marker (%) to warn us that we have to decode the number in a special way as a binary number.

However, before you decode you need a rule for decoding – so how do you get the number "four" from %100? What's the rule?

Let's take a detour for the moment, and think about the coins we use every day. Our currency consists of these coins:

50p, 20p, 10p, 5p, 2p and **1p.** We can combine them to give any sum we wish: For example:

75p is **50p** + **20p** + **5p**
or **50p** + **10p** + **10p** + **5p**

and so on. We are all familiar with this – often we use multiples of coins to make up a sum. For example, 5p can be **2p** + **2p** + **1p**

Using the same coin twice, though, often means that we end up carrying unnecessary amounts of change, and I for one don't like doing that.

Sometimes, however, with our present coinage system we have to use the same coin twice to obtain certain sums. You cannot, for instance, make up the sum of 4p without doubling up on coins. To avoid repeating coins we would have to invent a 4p coin!

Let's do that; in fact, let's invent a coinage system where you never have to use the same coin twice.

First of all we would need a **1p** coin and, of course, a **2p** coin, because we cannot use **1p** + **1p** for 2p – it breaks the rule!

Now 3p can be made up of **1p** + **2p,** but for 4p we'll have to invent a **4p** coin.

Equipped with that we can make 5p (**4p** + **1p**), 6p (**4p** + **2p**), and 7p (**4p** + **2p** + **1p**). In obtaining 7p we used all our available coins, so now we have to invent an **8p** coin. If you work it out (and I suggest you have a go) you will find that with the coins you have at your disposal (**8p, 4p, 2p, 1p**) you can make any sum up to 15p. Then you would have to invent a new coin, **16p.**

Notice how the coins we have created have doubled in value: **1p, 2p, 4p, 8p, 16p.** No prizes for guessing what the next one is.

Let's summarise our results in a table (Figure I). Here I have used the columns to show the coins available and the rows to show how the various totals are made up. A 1 in a particular column means that we use that column's coin, and 0 means that we don't use it. Look at the row for 5p. It has 101 on it. According to our rule, this means we pick out the coins **4p** and **1p** (and NOT **2p**) to make up the 5p total.

	4p	2p	1p
%	1	0	1
→	4p	+	1p = 5p

Now let's get back to computers by dropping all this talk about coins and redraw Figure I to show the same information but without referring to money – just numbers. Figure II is the new table.

As you can see, there is little change, and we can use this table to encode numbers in general, not just coins. We call this method of encoding the binary system.

Remember, to show that we mean

a binary number we precede it with %. So if you see, for example, %101 means:

```
      4  2  1
   %  1  0  1
   →  4  +  1 = 5
```

that is we add together the values of the columns containing 1. Look at row 5 of the table to check it. Similarly, %1101 would mean 13 in the denary system since

```
      8  4  2  1
   %  1  1  0  1
   →  8 +4  +  1 = 13
```

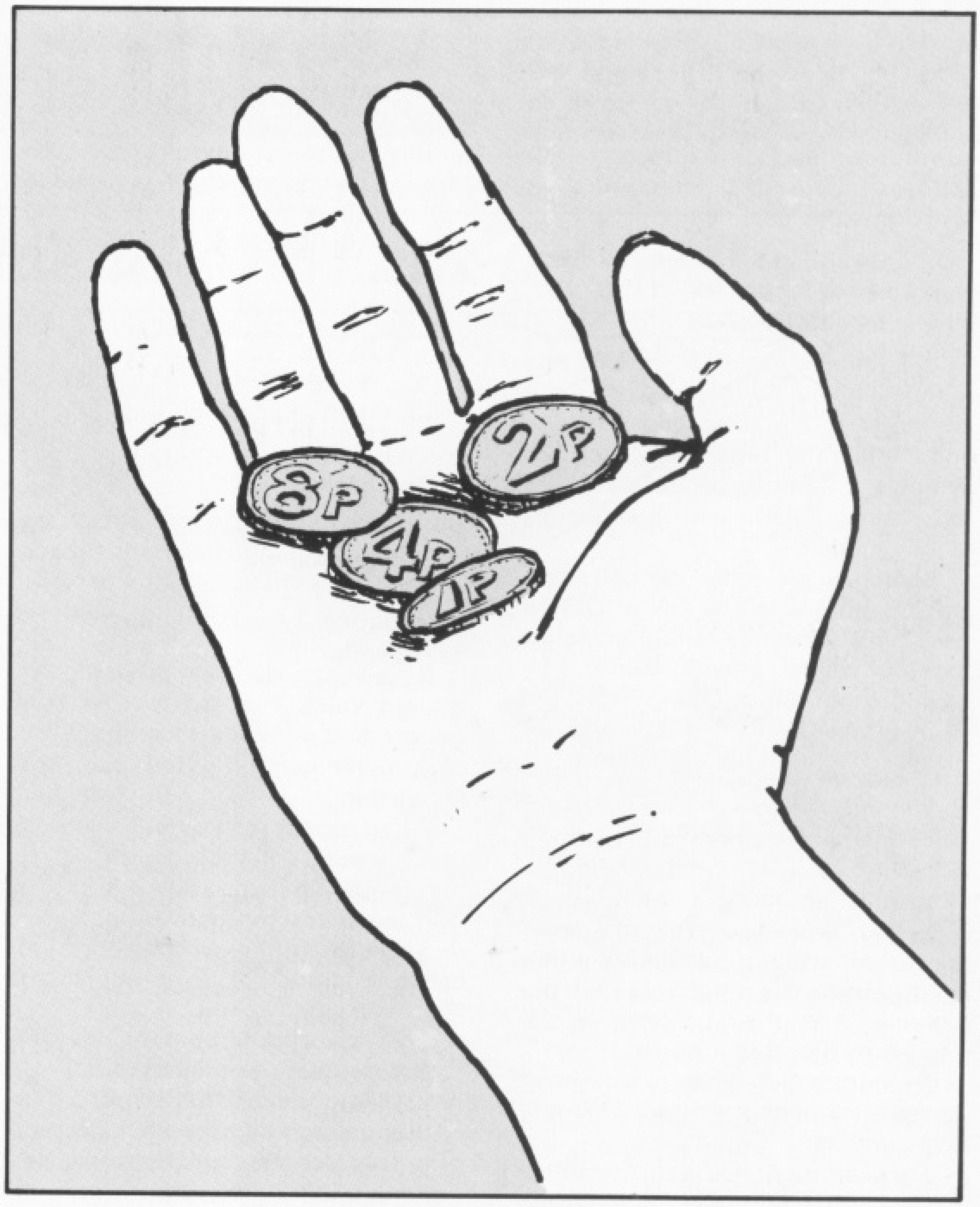
By now you should be able to work out for yourself why %100 represents four. From the table, or by using the addition method I've just illustrated, see if you can decode the denary values of the following binary numbers:

%1001
% 101
% 11
%1101
% 111

You can use the program accompanying this article to check your results. You've probably noticed by now that in the binary system you only use two symbols, 0 and 1, to encode numbers – hence binary, bi– for two as in bicycle.

You can encode any number that you want in binary – just use more

→



TOTALS	COINS 8p	4p	2p	1p
1p				1
2p			1	0
3p			1	1
4p		1	0	0
5p		1	0	1
6p		1	1	0
7p		1	1	1
8p	1	0	0	0
9p	1	0	0	1
10p	1	0	1	0
11p	1	0	1	1
12p	1	1	0	0
13p	1	1	0	1
14p	1	1	1	0
15p	1	1	1	1

Figure I

Denary Value	Column or Bit Values 8	4	2	1	Binary Value
1				1	%1
2			1	0	%10
3			1	1	%11
4		1	0	0	%100
5		1	0	1	%101
6		1	1	0	%110
7		1	1	1	%111
8	1	0	0	0	%1000
9	1	0	0	1	%1001
10	1	0	1	0	%1010
11	1	0	1	1	%1011
12	1	1	0	0	%1100
13	1	1	0	1	%1101
14	1	1	1	0	%1110
15	1	1	1	1	%1111

Figure II

columns (or "bits" as we say in computer jargon), remembering that each new bit is worth double the preceding bit.

However it does get terribly cumbersome. For example, 100 (denary) encoded in binary is %1100100 since:

```
   64 32 16  8  4  2  1
%   1  1  0  0  1  0  0
→  64+32+4=100
```

It is much easier to handle the number in our normal system. To a computer this presents no problem, and the fact that binary only uses two symbols is a bonus because you can represent numbers with a sequence of "switches".

Switches are what we call "two state" – they're either ON or OFF. If we have a sequence of four switches together we can encode numbers by having them either ON or OFF. We could use ON to mean a 1, and OFF to mean a 0 in a particular column:

```
     8    4   2   1
    ON  OFF  ON  ON
→ % 1    0   1   1 = 11
```

Each of these "switches" represents a bit, and a computer memory is full of bits. The 6502, which is the microprocessor at the heart of the Atari system, deals with many thousands of them.

To make things simpler the 6502 handles the bits in groups of eight bits at a time – the group of eight being called a byte.

With this type of organisation the largest number you can store in a byte is 255 since:

```
  128 64 32 16 8 4 2 1
 %  1  1  1  1 1 1 1 1
 →  128+64+32+16+8+
       4+2 +1=255
```

Of course the computer can handle larger numbers *(and not just whole numbers)* but to do so it must use more than one byte.

Converting a byte from binary to denary is fairly straightforward. Simply write it down under the appropriate column (or bit) values and add together the value of all the columns in which a 1 occurs. For example, given %10010101 you translate as follows:

```
  128 64 32 16 8 4 2 1
 %  1  0  0  1 0 1 0 1
 →  128+16+4+1=149
```

Going from denary to binary is not at all difficult, but is rather hard to put into words. You do it by subtracting from the number you want to encode the value of each column in turn, starting with the highest (i.e. 128, 64, 32 and so on).

If you can subtract a particular column value you put a 1 in that column and continue to subtract the next lower column value from the remainder.

If you cannot manage the subtraction you put a 0 in that column and try to repeat the subtraction with the next lower column number.

So, starting with the highest column number (128 in our case), you:

1. Attempt to subtract the relevant column number (highest first).
2. IF you succeed THEN put a 1 in that column number and continue to subtract other columns from the remainder. Otherwise, put a 0 in that column.

Figure III should make it clearer.

In practice, when faced with encoding a number from denary to binary I tend to do it in my head, seeing which column values will add together to make the sum required, starting with the highest first.

For example, if I were to encode 161 in binary I would say, "Well, I can use 128, so that leaves me 33 to find. 33 can be made up of 32 and 1 so that does it: 128+32+1=161. So I encode it as:

```
  128 64 32 16 8 4 2 1
 %  1  0  1  0 0 0 0 1
       = %10100001
```

After a while you'll find this way quite simple.

To finish off, I'll leave you with a program to print out the binary value of a number between 0 and 255 (i.e. that can be stored in one byte). Try it with various values and see if you can accept the results.

```
10 TRAP 190
20 GRAPHICS 0
30 OPEN #1,4,0,"K:"
40 ? CHR$(125)
50 POSITION 5,5
60 PRINT "Number";
70 INPUT NUMBER
80 IF NUMBER>255 OR NUMBER<0
OR INT(NUMBER)<>NUMBER THEN
GOTO 40
90 POSITION 5,10
100 FOR LOOP=7 TO 0 STEP -1
110 ANSWER=NUMBER-2^LOOP
120 IF ANSWER>-1 THEN NUMBER=
ANSWER:?"1";:GOTO 140
130 ? "0";
140 NEXT LOOP
150 POSITION 5,20
160 ? "ANY KEY FOR NEXT NUMBER"
170 GET #1,DUMMY
180 GO TO 40
190 CLOSE #1
```

The program itself uses one or two ideas that may not be too familiar to you as yet.

Worry not, future articles in *Atari User* will cover them. Watch this space . . .

149	
−128	128 goes – set to 1
21	64,32 can't go – set to 0
−16	16 goes – set it to 1
5	8 can't go – set to 0
4	4 goes – set to 1
1	2 can't go – set to 0
−1	1 goes – set to 1
0	

128	64	32	16	8	4	2	1
1							
	0	0					
			1				
				0			
					1		
						0	
							1
% 1	0	0	1	0	1	0	1

Figure III



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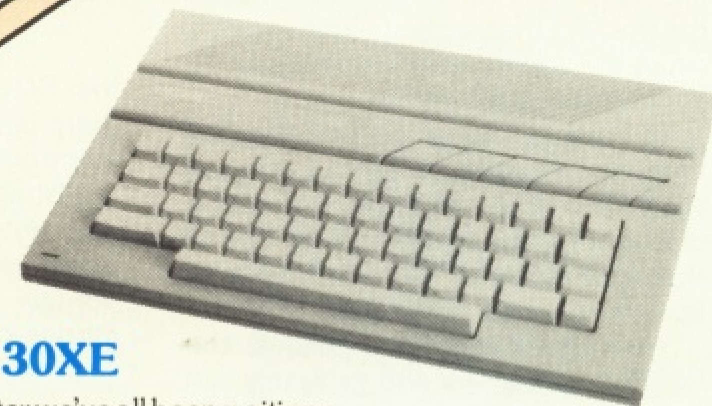
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PETE BIBBY examines the Atari's sound chip and reports, regretfully . . .

It sounds easier than it looks

AS you'll already know, your Atari micro is a clever little beast. One of the cleverest things about it is the sound chip it contains which allows all manner of wonderful (and not-so-wonderful) noises to accompany your programs.

However there's always a fly (or is it a bug?) in the ointment of microcomputing. With Atari sound it's the fact that, at first sight at least, using the sound facilities needs an IQ somewhere near genius.

In point of fact, when you take the time and trouble to get to know it you'll find that although the sound chip is complex, using it needn't be all that complicated. You just have to take it one step at a time.

However, at first sight all the PEEKs and POKEs and registers can be quite offputting to the would-be Atari musician. This is a pity because you can achieve a fair command of Atari sound using just one simple Basic command, the aptly named SOUND command. This is the one we'll be exploring in this article.

The SOUND command takes the form:

```
SOUND channel,pitch,distortion,
volume
```

Don't worry too much about the parameters following the SOUND. We'll deal with those later in the article. For the moment, thrill to the sound of your Atari by typing:

```
SOUND 0,200,10,8
```

and pressing Return.

Unless you're deaf, you'll notice two things. The first is that the note produced comes from the television. If you don't believe me, try turning the TV's volume control and hear the difference.

The second thing you (and the rest of the family) will become aware of is the fact that the note carries on. And on. And on.

A quick glance at our formula for the SOUND command shows that there is no parameter controlling the length of the note it produces.

Other micros have a duration parameter. The Atari has none. So when you enter a SOUND command directly into the micro the note just carries on.

By this time the note produced by:

```
SOUND 0,200,10,8
```

will probably be getting on your nerves. There are three ways to stop it, not counting a sledgehammer. The first two are either to switch off the micro or hit the Reset button. The trouble is that these are a bit drastic.

A much more elegant solution is to use:

```
SOUND 0,0,0,0
```

which in effect tells channel 0 to shut up. But now I'm getting ahead of myself, as we haven't met channels yet.

As you'll know from some of the games you've played, your Atari isn't limited to playing just one note at a time. It can produce some quite complex harmonies using up to four notes simultaneously.

This is possible because the Atari's sound chip has four channels, each channel being able to produce a separate note.

The channels are numbered from 0 to 3 and we select which channel a SOUND command uses by putting the appropriate number in its channel parameter. So (ignoring the other parameters which we'll come to shortly):

```
SOUND 0,200,10,8
```

used channel 0 while

```
SOUND 3,200,10,8
```

plays its note on channel 3. Notice that to switch off the sounds, you have to use:

```
SOUND 0,0,0,0
```

for channel 0 and:

```
SOUND 3,0,0,0
```

for channel 3.

The more suspicious of you may think I'm cheating. After all the note was the same on both channel 0 and channel 3. Maybe there's only one channel.

For the Doubting Thomases among you I'll jump ahead a little and use some of the other SOUND parameters to play a chord using notes on all four channels.

```
SOUND 0,243,10,8
SOUND 1,193,10,8
SOUND 2,162,10,8
SOUND 3,128,10,8
```

Now do you believe me? If you switch off the notes with:

```
SOUND 0,0,0,0
SOUND 1,0,0,0
SOUND 2,0,0,0
SOUND 3,0,0,0
```

you'll not hear the four channels, if you see what I mean.

So to sum up, we've found that we

can use the SOUND command to make a noise on one or more of four sound channels. This noise carries on until we switch it off with the appropriate:

```
SOUND channel,0,0,0
```

where channel takes a value from 0 to 3.

Incidentally, have you tried using other channel numbers such as 5 or −1? It's not allowed. You'll find you get an error 3 message.

When we played our four note chord earlier you may have noticed that each SOUND command had a different pitch parameter. Channel 0 had a pitch parameter of 243, channel 1 had one of 193 and I leave it to you to figure out the pitch parameters for the remaining two channels.

It's the pitch parameter that decides how high or low the note is going to be. It can take values from 0 to 255. The bigger the number the lower the note produced, the smaller the number the higher the note. Enter:

```
SOUND 2,240,10,8
```

and, after a short delay:

```
SOUND 2,16,10,8
```

and you'll hear what I mean.

For the musically inclined, the range of values from 0 to 255 gives over three octaves with middle C being equal to 121.

The trouble is that there is no standard increment or decrement in the pitch parameter which corresponds to a semitone. You either have to look them up in a table or play them by ear. I prefer the second technique.

There is one rule that the pitch parameter does follow, and that is the rule of octaves. If you halve the value of a pitch parameter you get the same note an octave above. If you can't follow that, or don't know what an octave is, playing:

```
SOUND 0,200,10,8
```

followed successively by:

```
SOUND 0,100,10,8
SOUND 0,50,10,8
SOUND 0,25,10,8
```

should show you.

The more inquisitive may wonder what happens if you carry on the above experiment and enter:

```
SOUND 0,12.5,10,8
```

Try it and see. The Atari expects whole numbers in the pitch parameter. In this case it rounds 12.5 up to 13.

As we've said, the pitch parameter can vary from 0 to 255, with 255 giving the lowest note, 1 the highest and 0 silence. What happens if we wander outside this range?

If we use a negative pitch parameter, the micro doesn't like it and comes back to you with an error 3 message. However if we use a number higher than 255 then, rather than bring things to a halt, the micro keeps on taking 256 away from the excessive pitch parameter until it is within range. More technically, it takes the pitch parameter MOD 256. Hence:

```
SOUND 2,300,10,8
```

produces the same note as:

```
SOUND 2,44,10,8
```

and:

```
SOUND 2,556,10,8
```

even though the pitch parameters involved are vastly different.

Now that we've got halfway through the parameters of the SOUND command, let's use them in a program such as Program I. Type it in and Run it.

```
10 REM PROGRAM I
20 SOUND 0,243,10,8
30 SOUND 1,193,10,8
40 SOUND 2,162,10,8
50 SOUND 3,128,10,8
```

Not very exciting, is it? It's all over in a flash.

What has happened shows us the way the SOUND command differs according to the circumstances in which it is used. When it's entered directly into the micro, as we were doing up until Program I, the notes produced just carry on and on until we stop them or play another note on that channel.

However when we use them in a program the notes produced last only as long as that program. When the program ends, so does the note.

Try extending the life of Program I with a delay loop such as:

```
60 FOR DELAY=1 TO 1000:NEXT DELAY
```

and you'll hear the chord.

This is the method of getting round the afore-mentioned lack of a duration parameter. Crafty use of varying delay loops can ensure that the notes produced by a SOUND command are as long or short as we desire.

But enough of this making up for a parameter we lack, there are still two parameters we haven't discussed yet, involving distortion and volume.

The distortion parameter actually distorts the sound played by a channel. Taking values that range from 0 to 14 in steps of 2, it's the distortion parameter that allows tha Atari to produce all the special effects sounds like explosions and machine guns.

Program II will let you hear it at work. Try it out with notes of pitch other than 200 and hear its effect.

```
10 REM PROGRAM II
20 FOR DISTORT=0 TO 14 STEP 2
30 PRINT DISTORT
40 SOUND 0,200,DISTORT,15
50 FOR DELAY=1 TO 1000:NEXT DELAY
60 NEXT DISTORT
```

You'll notice that a distortion of 10 gives an almost pure note, hence I've been using it in the examples so far. A distortion of 14 is also acceptable as an unadulterated tone.

As before, if you use a negative distortion you're rewarded with an error 3 report for your pains. If you use values outside the range you'll find that the Atari uses the distortion MOD 16. This means that:

```
SOUND 0,200,26,15
```

produces the same note as:

```
SOUND 0,200,10,15
```

The final parameter in the SOUND →

ERROR 3

If we use a negative pitch parameter the micro doesn't like it

SOUNDS INTERES

IF you've enjoyed Pete Bibby's introduction to the SOUND command, here's a program to give you some ready-made sounds.

We've included 12 sounds, but you can easily alter them to suit your own tastes.

The names displayed in the menu can be altered in lines 130-160 and the sounds themselves are identified by a REM statement. They start at line 400 and are pointed to by the ON ... GOSUB in line 180.





```
10 REM SOUNDS INTERESTING
70 DIM U$(5)
80 U$=CHR$(156)
100 GRAPHICS 0:POKE 752,1:POKE 710,195
:? CHR$(125);:POKE 712,170:COLOR 32:PL
OT 2,0:POKE 709,15
110 POSITION 17,2:? "SOUND";
120 POSITION 13,3:? "DEMONSTRATION"
125 POKE 82,10
130 POSITION 10,7:? "1)  BOUNCING BALL
":? "2)  COMPUTER THINKING":? "3)  JAC
K HAMMER":? "4)  FOOTSTEPS"
140 ? "5)  CAR HORN":? "6)  OCEAN":? "
7)  GUNSHOTS"
150 ? "8)  BIRDS":? "9)  AMBULANCE":?
"10) POLICE CAR":? "11) FALLING MISSIL
E"
160 ? "12) POWER GENERATORS"
170 TRAP 200:POSITION 0,22:? U$;U$;CHR
$(127);"OPTION";:INPUT A:IF A<1 OR A>1
4 OR A<>INT(A) THEN 170
180 ON A GOSUB 400,450,500,550,600,650
,700,750,800,850,900,950
190 GOTO 100
```

From Page 47

statement governs volume and it ranges in value from 0 to 15. The loudest note is given by a value of 15, the quietest by a value of 1 (unless you count 0, which gives silence, as the quietest).

A negative volume brings the old familiar error 3 report, while volumes of 16 and over just produce silence.

One point to remember is that the 0 to 15 range is relative. The actual loudness of the note produced depends on how loud you have the volume on your TV. If you don't follow that, try turning the TV sound down very low and playing:

```
SOUND 1,100,14,15
```

and then turning the volume up. The note gets louder even though the volume parameter is still the same.

And that's more or less the end of our exploration of the SOUND command. Table I sums up the values that the parameters can take.

As you've seen, and heard, it's not that hard to grasp, and simple tunes should be within the scope of beginners to programming.

And if you can't be bothered to write your own tunes Program III, a random music generator, will do it for you. What seems utter rubbish at first becomes surprisingly soothing as you listen to it.

If you're feeling adventurous, try distortions other than 10. You could become a big noise in the world of Atari sound!

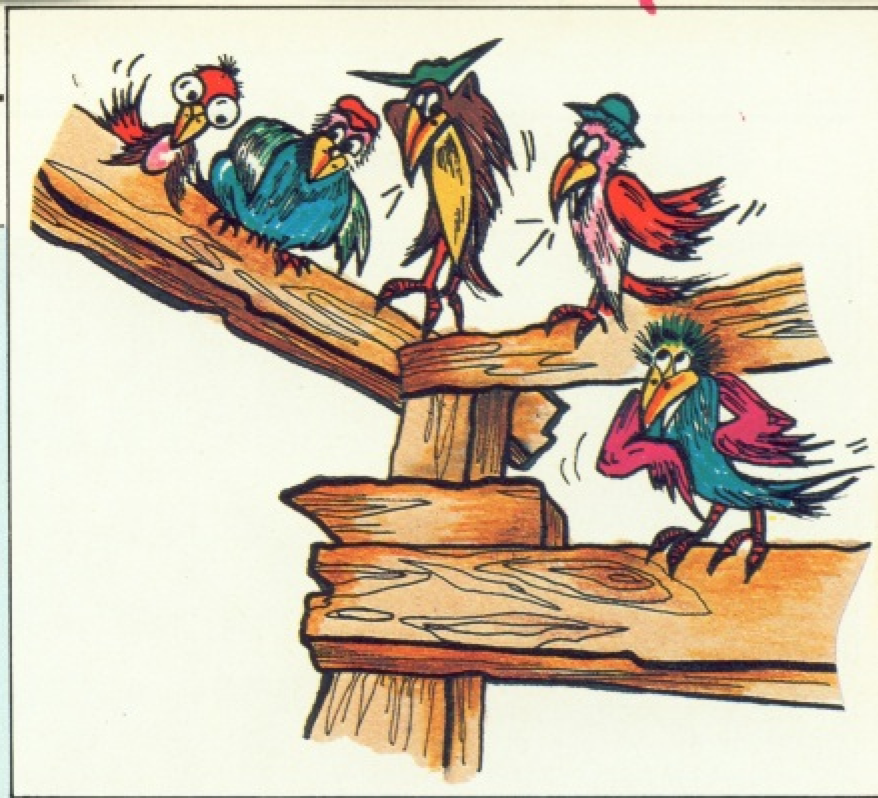
channel	pitch	distortion	volume
0 to 3	0 to 255	0 to 14 (in 2's)	0 to 15

Table I: SOUND parameter values

```
10 REM PROGRAM III
20 FOR X=1 TO 100
30 CHANNEL=INT(RND(0)*4)
40 PITCH=INT(RND(0)*256)
50 VOLUME=INT(RND(0)*16)
60 DELAY=INT(RND(0)*1000)
70 SOUND CHANNEL,PITCH,10,VOLUME
80 FOR LOOP=1 TO DELAY:NEXT LOOP
90 NEXT X
```

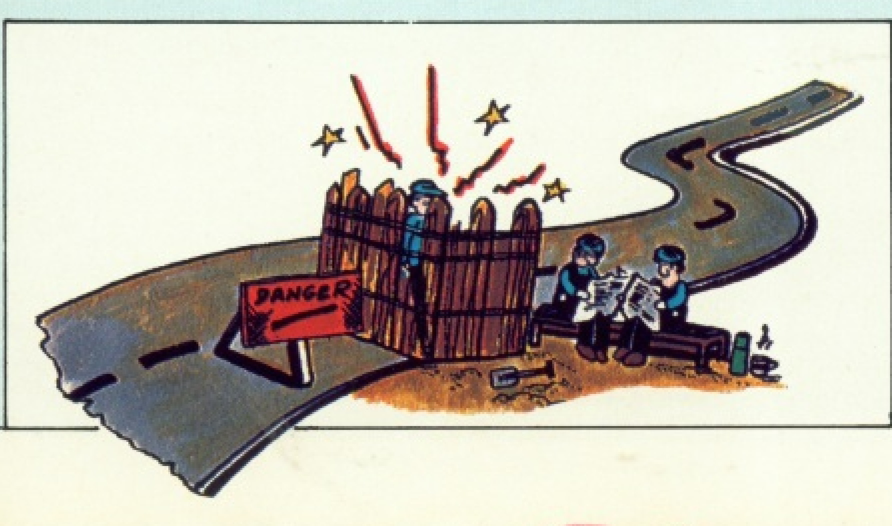
Program III





STING...

```
200 ? CHR$(253):GOTO 170
400 REM BOUNCING BALL
405 FOR T=1 TO 6:FOR X=1 TO 5
410 SOUND 0,120,14,4
415 NEXT X
420 SOUND 0,0,0,0
430 FOR Y=1 TO 500:NEXT Y
435 NEXT T
440 RETURN
450 REM COMPUTER THINKING
460 FOR Z=1 TO 100
470 SOUND 0,INT(RND(0)*75),10,8
475 NEXT Z
480 SOUND 0,0,0,0
490 RETURN
500 REM JACK HAMMER
510 FOR Z=1 TO 200
520 SOUND 2,100,6,4
530 NEXT Z
540 SOUND 2,0,0,0
545 RETURN
550 REM FOOTSTEPS
552 FOR TIME=1 TO 10
554 SOUND 0,6,13,8
555 FOR A=1 TO 255 STEP 5
556 SOUND 1,0,0,0
558 FOR X=1 TO 100:NEXT X
560 SOUND 0,0,0,0
565 SOUND 1,11,13,8
570 FOR X=1 TO 100:NEXT X
575 SOUND 0,0,0,0
580 NEXT TIME
590 SOUND 1,0,0,0
595 RETURN
600 REM CAR HORN
610 SOUND 0,60,10,8
620 SOUND 1,70,10,8
630 SOUND 2,10,8,2
640 FOR X=1 TO 700:NEXT X
645 SOUND 0,0,0,0:SOUND 1,0,0,0:SOUND
2,0,0,0
646 RETURN
650 REM OCEAN
655 FOR Z=0 TO 10
660 SOUND 2,Z,8,4
665 FOR I=1 TO 30
670 NEXT I:NEXT Z
675 FOR Z=10 TO 0 STEP -1
677 SOUND 2,Z,8,4
680 FOR I=1 TO 100:NEXT I
685 NEXT Z
690 SOUND 2,0,0,0
695 RETURN
700 REM GUNSHOTS
705 FOR T=1 TO 3
710 SOUND 0,80,0,11
715 FOR Z=1 TO 200:NEXT Z
720 SOUND 0,0,0,0
725 FOR Z=1 TO 300:NEXT Z
730 NEXT T
740 SOUND 0,0,0,0
745 RETURN
750 REM BIRDS
755 FOR J=1 TO 10
760 FOR I=1 TO 20
765 SOUND 2,I,10,8
770 NEXT I
780 NEXT J
790 SOUND 2,0,0,0
795 RETURN
800 REM AMBULANCE
805 FOR A=1 TO 10
810 SOUND 0,50,10,8
815 FOR B=1 TO 50:NEXT B
820 SOUND 0,100,10,8
825 FOR B=1 TO 50:NEXT B
830 NEXT A
835 SOUND 0,0,0,0
840 RETURN
850 REM POLICE CAR
855 A=1:B=1
860 FOR C=1 TO 240
865 B=B+A
870 IF ABS(B)>15 THEN A=-A
875 SOUND 0,45+B,10,8
880 NEXT C
885 SOUND 0,0,0,0
890 RETURN
900 REM FALLING MISSILE
910 FOR Z=30 TO 200
915 FOR C=1 TO 3
920 SOUND 2,Z,10,8
930 NEXT Z
940 SOUND 2,0,0,0
945 RETURN
947 RETURN
950 REM GENERATORS
955 FOR A=1 TO 500
960 SOUND 0,70,12,8
965 SOUND 1,71,12,8
970 NEXT A
975 SOUND 0,0,0,0
980 SOUND 1,0,0,0
985 RETURN
```





SMASH HITS 3 COLLECTS THE LOLLIPOP

ENGLISH Software has released three volumes of **Atari Smash Hits,** but we've only had Volumes 2 and 3 sent for review so I won't be saying much about Volume 1.

All three volumes contain *Jet-Book Jack,* probably the best-known of the games. In fact, if you haven't already got Jet-Boot Jack it might be worth buying one of these volumes to fill the hole in your collection.

In addition to being a good game it has several features which other manufacturers would do well to copy, like the facility to set the skill level and the option to skip lower levels.

As well as Jack, Volume 2 contains four other games to keep you amused. They're not all arcade games either.

Stranded is an adventure game in which you play the part of Special Agent Sid – even if you are a woman! You've been dumped on a strange planet and your mission is to return home safely.

The game uses fairly simple line drawings on the top half of the screen, with the location descriptions and commands appearing on the lower half.

There's a Help facility if you're stuck, although the hints aren't always very useful, and the game can be saved and reloaded at any point.

Meanwhile, back at the joystick, *Diamonds* casts you in the role of Digger Dan the prospecting man. Your task is to collect all the diamonds while avoiding such characters as Brian the Blob and Phil the Filler.

There are 16 levels so it will keep you busy for some time. There's a pause facility which I found essential so I could have a wrist-rest, because the game seems to be very slow at reading the joystick – as though it's written in Basic! This resulted in my applying extra pressure, hence the need for a break.

The Adventures of Robin Hood is not actually an adventure game. Robin's task is to collect the bags of silver and kiss Maid Marian while avoiding the arrows of the Sheriff's men.

He moves along a horizontally scrolling landscape and has an amazing ability to climb up trees and buildings. As the levels increase, so do the number of bags of silver to be collected. The skill level can be selected.



I must admit I got bored very quickly with this one, despite the interesting Olde English computer music.

Citadel Warrior, the last of the five on Volume 2, is a two-dimensional scrolling maze which you must explore in order to defuse the cyclotron bombs. Since only part of the maze is visible on the screen, you've got to remember where the fuel dumps are.

Your fuel is used up at an alarming rate – a bit like driving a Range Rover. Also, coming into contact with the walls uses more fuel, and there are security robots to avoid.

It's a familiar theme, reasonably well implemented. The only thing which spoiled the game for me was the fact that when you come in contact with the wall, the whole screen judders. After a while, this had a horrible effect on my eyes. Still, I'll play it a bit and risk one eye!

After the obligatory *Jet-Boot Jack,* Volume 3 gets under way with *Airstrike 2* (by Rocket Raid, out of Scramble). Unlike some versions, this one gives you a limited supply of missiles and bombs.

It's a good game if you like that sort of thing – which I do. What a pity the demo mode cheats by flying through every obstacle, otherwise you might have gleaned some hints on strategy. Still, it's nice to see what evil awaits you at the farther reaches.

Batty Builders was a delightful surprise since I hadn't encountered it before. It sounds simple – you have to build a wall by catching bricks as they fall off a conveyor belt.

However, to be successful requires speed, accuracy and some strategic thinking. The bricks drop quite fast and are deadly if they hit you. In order to catch them, you must be directly below with your arms raised.

There are four shades of brick and in order to maximise points you must build the wall in a set pattern. If you don't throw the bricks accurately, they don't always end up where you intended and may

well spoil the pattern.

You must also consider the pattern in deciding whether to catch any particular brick, or be quick to move out of its way.

On level 1 you only have the bricks to contend with. On higher levels – there are eight altogether – there are boxes of TNT moving around your legs to make life difficult.

The TNT makes level 2 a lot harder than level 1 – I would have preferred a more gradual transition between levels. Even so, it's still a good game.

By including *Breath Of The Dragon,* Volume 3 uses a technique borrowed from the record industry. It's not uncommon for a 'greatest hits' album to contain one previously unreleased track, so why should software houses be any different?

The game is a sort of adventure game but requires arcade-type skills. You are trapped in the inner circle of a double maze which you must explore in order to find enough provisions to see you through the outer maze – always assuming you can find the door.

The dragon is just one of the hazards to be avoided as you roam around. The walls and ceilings are fatal to the touch, as are the mobile false teeth, the giant spiders and other assorted nasties.

It's one of those games which take a while to develop as you learn the various skills – like jumping over the rubbish without hitting the ceiling.

The instructions leave you to work out the various possible movements and it was a while before I realised I could lie down . . . not like me at all.

Once you get the hang of it there are six selectable skill levels to keep you busy into the night.

Finally on Volume 3, *Neptune's Daughters* await rescue by an intrepid aquaman who absorbs oxygen "through the gills on the side of his neck". I suppose if you're going to have gills, you might as well have them there.

You are armed (or should I say finned?) with an unlimited supply of harpoons with which to do battle. The foes include sucker plants, an octopus which only gets stunned by the harpoons, and killer amoebae.

The action obviously takes place off-shore from Sellafield because the amoebae are as big as the aquaman himself. Biology aside, though, the game is challenging enough to be fun.

The cassette version of each volume costs £14.95 with the equivalent discs being £17.95. Of the two volumes I've looked at here, I prefer Volume 3 and would consider it much better value. It contains five games that I'd play again, which works out at about £3 a game on the tape.

I'd only go back to four of the games on Volume 2, but because it contains a "traditional' adventure it might well appeal more to some people than Volume 3. Either way, you pay your money and you get a fair bit of choice.

Dave Russell

The Silicon Dream gets off to a pretty good start



IF you go by the number of locations, **Snowball** must be one of the biggest adventure games ever. It boasts over 7,000 of them, but fortunately you don't have to map the complete set.

According to Level 9, the action takes place aboard a starship that could actually work. Not having the facilities to check this statement, I'll take their word for it.

The Snowball is an aptly-named interstar freezer ship containing two million frozen colonists. You play the part of Special Agent Kim Kimberley, woken while the ship is in transit.

The fact that you've been woken means that something is wrong. It's your job to find out what's happened and save the lives of the passengers.

Being based on a 'working model', the problems to be solved in Snowball are logical rather than magical. However, as the manual suggests, some of the technology used might be described as magical in 1980's terms.

You start the game in your coffin and your first problem is to get out of it. Pretty soon you encounter the Nightingales, a lethal variety of robot that polices the starship mortuaries.

The game follows the classic adventure style in that you are awarded points for certain actions. There is a maximum score of 1,000, but you can complete the game with a less than perfect score so it's not like having to collect a given number of 'treasures'.

Level 9 have developed a powerful parsing system, so your input can be a bit more than Get Sword or Kill Dragon. You can even use IT to refer to the object of the previous command, which saves a lot of time in the long run.

Having said that I noticed some anomalies. If you want a break from the game itself, find a safe location and try typing in the alphabet a letter at a time.

Some care has obviously gone into creating the character of Kim because even with a picture on the cover of the manual and a personality profile inside, it's not clear whether Kim is male or female. This means that no matter who is playing the game they can think themselves into the role.

I really appreciate this aspect – you've no idea how fed up I am of pretending to be a hairy-armed yobbo.

In fact I really enjoyed playing Snowball and would recommend it to anyone who likes a good adventure and is fed up with dwarves and swords.

My only complaint is that BBC Micro owners get a better deal. Presumably by the use of some clever interrupt programming, the Beeb version of the tape plays a lovely tune while loading.

Given that the official Atari tape-deck has an audio channel as well – which the 'conversational' series of language tutorials put to good use – Level 9 could have included the tune without even needing the clever programming.

Snowball is the first of a Silicon Dream trilogy. The second in the series, Return to Eden is now available and if it's as enjoyable as Snowball I'll be out of circulation for the next few weeks.

Elisabeth Dennis

Life gets hectic when Drop Zone is running

ONE of the best measures of a good arcade game is the crowd that builds up around you while you're playing it.

Every time I loaded **Drop Zone** from U.S. Gold, people gathered around me in the office and wanted to play it. Some of them even scored more than me, which meant I had to keep playing just one more time.

The object of the game is to protect the men on the planet from the invading aliens and return them one by one to the Dropzone where the landing pad is located.

As the press release admitted, the game comes out of the Defender mould. Instead of the usual space-ship, though, you have a Jetpac type of character who shoots from the navel!

The 3-D landscape looks like it was constructed from the pictures that the Mariner (or was it Voyager?) mission sent back. It's a Martian red, and it scrolls beautifully as you zoom around.

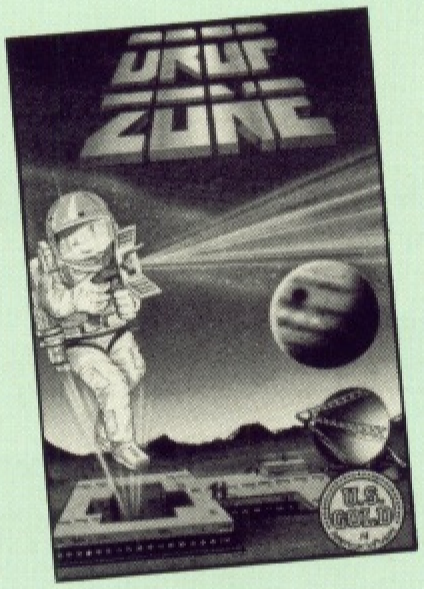
Not that you get much chance to zoom around once the alien hordes catch sight of you. The explosion when they catch you is what the blurb calls a "volcano" – like an expensive firework – and had several of the onlookers asking me to get killed off so they could see it again.

Beneath the landscape is your "high speed scanning viewer" – a sort of radar on which you can see where the aliens are. I decided it's called "high speed" because unless I looked at high speed the aliens caught me while I was still taking the information in.

You need to sit close to the keyboard in order to make use of the cloak and strata bombs. Although you have unlimited fire-power, the cloak runs out quite quickly and you only get three bombs.

Score over 10,000 points and you get another life and another bomb. The cloak is replenished as you complete each level.

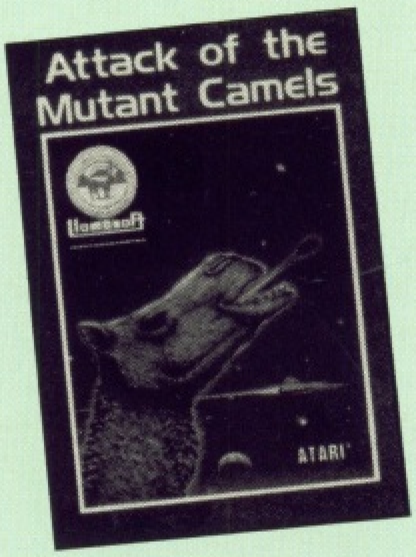
You'll need to exceed 10,000 to get in the hall of fame too, but it's worth the effort to see the colour display as you enter your initials.



If you're an arcade freak like me, you'll love Drop Zone. It will set you back £14.95 for the disc version or £9.95 for cassette, and you need at least 48k. I fail to see why the disc should cost £5 more, but the tape is worth it if you can stand the 10-minute wait while it loads.

Come to think of it, you might as well use the loading time to relax – life will be pretty hectic once Drop Zone is up and running.

Cliff McKnight



I THINK it's true to say that there aren't that many games around where you can bounce off a 90 foot high camel while trying to blast it with your spaceship's neutron cannon.

If there *are* other games in which you can do this, chances are that they come from Jeff Minter's Llamasoft, as does **Attack of the Mutant Camels.**

This is a simple shoot-em-up arcade game, simple in concept if not in play. You have to shoot the six camels before they overrun the sector, It's the difficulties which make it a challenging, and therefore enjoyable, game.

For a start, control of your spaceship is not easy. Moving the joystick to one side turns the ship and starts it accelerating in the corresponding direction. Trouble is, once it is moving the ship has inertia. Suffice to say that control takes a bit of practice.

The camels need shooting more than once, and they shoot back. If you collide with one, you bounce off with tremendous force. If you're between two camels when you collide, you can be bounced back and forth. Bouncing is not to be recommended because it depletes your shield.

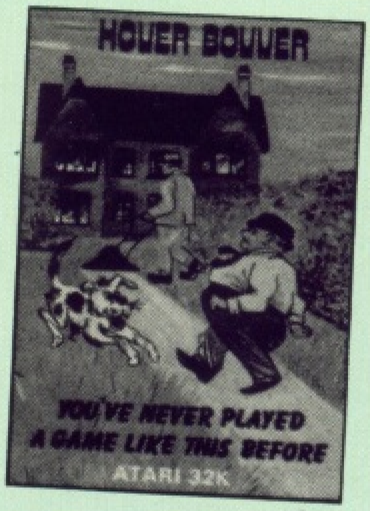
If you can clear the six camels you then enter hyperdrive. Whereas in most games this would simply lead to the next level, in Mutant Camels the hyperdrive is a challenge in itself.

After a warning, you start to accelerate across the landscape and a rocket barrage comes toward you. If you don't successfully dodge all the rockets you lose a ship and must clear the same sector again.

Before play starts you can choose from six levels of difficulty ranging from "Real Cool" to "Like Wow". The colour of the landscape reflects the level, from an icy blue to a scorching crimson.

Attack of the Mutant Camels is a difficult game to master even at the lower levels, and I enjoyed trying. The tape costs £7.50 and as far as I know it isn't available on disc.

Tony Larkin



HAVING seen the Commodore 64 version of **Hover Bovver,** I jumped at the chance to review it for *Atari User.* Maybe my expectations were too high, but I have to say I didn't like it.

I loved the storyline and the introductory cartoon, the music was fine (for the first hour anyway), it's just that I found the game almost unplayable. It didn't seem to respond to the joystick, so much so that I even began to think my joystick was faulty.

But as soon as I loaded another game the joystick seemed fine, so I have to conclude it was Hover Bovver.

The game is set in the English garden where Gordon Bennet is trying to mow his lawn. He's borrowed his neighbour's machine, and the neighbour wants it back.

There's a whole strategy to be worked out based on the behaviour of the various people, the tendency of the mower to overheat, and the necessity to keep an eye on the Dog Loyalty and Dog Tolerance displays at the bottom of the screen.

I *still* think the idea of Hover Bovver is good and I can appreciate the strategic elements even though I barely got chance to try them out.

The package boasts "You've never played a game like this before", and I have to agree! At £7.50 you should try before you buy.

Pat Cookson

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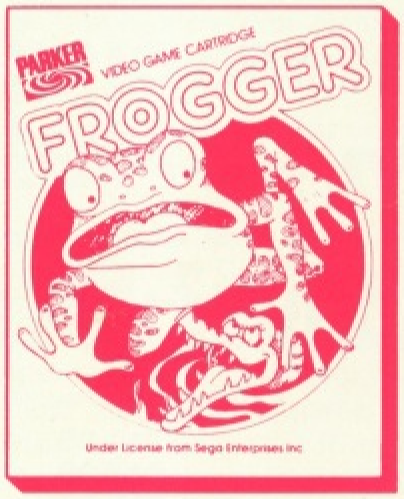
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Home may look like it's only a hop, skip and a jump away, but looks can be deceiving. First, there's a dangerous highway to hop across, full of cars and trucks. Then there's a swirling river to leap, full of frog-eating creatures. How will frogger get home safely? By letting you help him on his way. Guide Frogger home safely through this perilous journey based on the highly successful arcade game. The object of the game is to hop as many frogs to safety as you can-scoring points along the way! Frogger's journey takes him from the sidewalk across a busy highway to the riverbank and across the river to a home bay and safety. You'll start the game with 5 frogs and the game ends when all frogs have been lost.

ASTROCHASE — ROM — £7.95

This is a fast flying race through space. Your mission is to save the earth from destruction. Blast off and blaze across a scrolling, star studded galaxy. Seek out and explode mega mines that close in on you as they orbit the earth. But keep an eye out for attacking enemy vessels, they'll pursue you to the far corners of space! Fire your lasers or activate your shields and ram the enemy. You have got single thrust propulsion which is an amazing feature which lets you fire in one direction whilst speeding off in another. Save the earth from total doom and there is a secret reward waiting for you. This game gives spectacular graphics and requires both craft and strategy if you are to succeed in your mission.



POPEYE — ROM — £9.95

You are Popeye and your goal is to catch all of Olive's hearts, notes, and cries for Help before they hit the water and sink - or before Brutus, the Sea Hag or a Vulture knock you overboard. Each time you complete a round, you will automatically proceed to the next and more difficult level. Popeye can gain strength during the game by eating spinach. He is then able to knock Brutus overboard for bonus points. An accurate reproduction of the popular arcade game, Popeye is for 1 or 2 players.

Q*BERT — ROM — £9.95

The object of Q*bert is to score as many points as possible by changing the colour of the cubes on a pyramid from a starting colour to a destination colour. You'll do this by hopping Q*bert from cube to cube while avoiding the nasty characters who will try to stop him. A faithful reproduction of the original, Q*bert requires nerves of steel!

SUPER COBRA — ROM — £9.95

Based on a top arcade game, Super Cobra provides a test for the most skilled and daring player. Guide your helicopter gunship through 10,000 miles of mountains, skyscrapers and subterranean passages. Only then can you pick up the booty and make your getaway. You'll have missiles, coming at you from all directions, determined to shoot you down. The course comprises 11 sections of terrain, each more difficult than the last.

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6502

MIKE COOK takes you on a conducted tour of the Atari micro's power house

LIFT the bonnet of many Formula 1 racing cars and you are likely to see the same engine. OK the chassis is different, the suspension, gearbox and body are all different, but most of the engines are the same.

This is also true with personal computers. The microprocessor, the power house of your computer, is the same on many different models. So let's take a look at it and see how it shapes the rest of our machine.

There are two microprocessors which go to make the vast majority of computers – the Z80 and the 6502. In the Atari range the 6502 is used.

This is the same microprocessor as used in the Apple II, Pet, BBC and Electron, to name a few. They all share the same engine.

A beginner is often puzzled why they don't all share the same software. Well the answer is simple. They all have different electronic "bodies" wrapped round them, just like the racing cars.

This makes software written for one machine totally incompatible with any other machine. Let's see how this comes about by looking a little deeper into the structure of the 6502.

The 6502 microprocessor was first manufactured by MOS Technology in the early '70s so it is now well over 10 years old. However that does not mean that it is out of date or old technology, as some so-called experts think. The processor was so advanced when it was designed that only recently has technology been able to make full use of all its features.

It was designed as an improvement on the Motorola 6800 and made some radical changes. The improvement which was to prove the key to its success was not the power of its software instructions but the ease in which it could be made into a system. That is, it could be made into a computer with the addition of very few extra chips.

This made it the natural choice for early computers like the Apple I (yes it really did exist) and the Apple II. Eventually the company that made it were bought out by Commodore, the makers of the Pet.

Given this foothold of popular computers using the processor, quite a number of people became very proficient at programming it and so they chose it for the next generation of computers.

This was possible because the software instructions the processor obeys have turned out to be remarkably powerful. These instructions are known as the instruction set, and ultimately govern the power of the machine because everything the computer does must eventually be broken down to these basic instructions. The fewer instructions you need to express a problem the faster the machine will go.

These instructions are very simple, involving operations like moving data from one place to another or adding up two small numbers. Most real things you want to do need lots of these "mini" instructions.

Take, for example, a program to print "Hello" on the screen. It is likely that this would take about 20 instructions. To see why this is so we will need to look at how the microprocessor views the outside world.

To a 6502 the rest of the world looks like lots of different pigeon holes or memory locations. It can only cope with one of these at a time.

It signals to the electronics surrounding it which location it wants to access by setting the address of the location on 16 signal wires.

Each signal wire can be in one of two states, with a voltage on it (5 volts) or with no voltage on it (0 volts). We call these states one or zero. Yes, 5 volts is called one! You see, if we called it 5 then that would imply there was 4, 3, 2 and 1.

These voltage levels cannot exist in the circuit. The circuit can only be in one of two states – that's why we call it a binary condition.

As there are 16 of these address signal wires there are a lot of combinations of zero and one that they can be in. In fact if you work it out this comes to 65,536, or as we say in the jargon 64k. This is because 1k is 1024, a sort of baker's dozen version of 1000.

So anything connected to the microprocessor must fit into this 64k of address space. The wires that signal this address are known collectively as the address bus.

Up till quite recently 64k was a vast amont of memory, quite over and above anything that was practicable or affordable.

I remember in 1978 getting a memory board for one of my computers containing 4k of memory which cost twice as much as the Atari 800.

Even so I was impressed at how cheap it was, as it represented quite a big breakthrough at the time.

Nowadays you can get 64k of memory in just two chips, so you see

→

that technology has only recently caught up with the capabilities of this microprocessor.

The microprocessor examines the memory locations by means of eight signal wires. These carry information to and from the locations in the same sort of binary (one and zero) signals used on the address bus.

As these wires carry the information or data they are known collectively as the data bus. So if the microprocessor wants to look at a memory location it puts the address onto the address bus and reads the contents off the data bus.

Conversely, if it wants to store some information it again places the address on the address bus and the data it wants to write onto the data bus.

It is up to the electronics surrounding the processor to service its needs by taking or placing the data on the bus.

So the processor sees everything simply as memory locations. All the devices that make up the computer have to be allocated their own unique address or range of addresses.

This applies to the keyboard, the screen, cassette recorder, joysticks and whatever else goes to make up your particular computer. If designers choose to put these components in different places, or have a different mix of components, then inevitably software becomes incompatible.

As well as the external memory locations, the processor has inside it some internal memory locations. These are called registers, and each one is not given a numbered address but a name.

Admittedly they are not very imaginative names, but they suffice. They are called A (or the accumulator) X, Y, PC (program counter), S (status) and SP (stack pointer).

Each has its own use and every instruction that the processor can execute involves one or more of these registers. They are shown in Figure I. Let's take a look at what they are used for.

The program counter is the only 16 bit register, and it is used to hold the address of the next instruction. The processor puts this out onto the address bus and fetches the data in that location.

This is in the form of a coded instruction but before that instruction is executed the program counter is incremented to point to the next instruction.

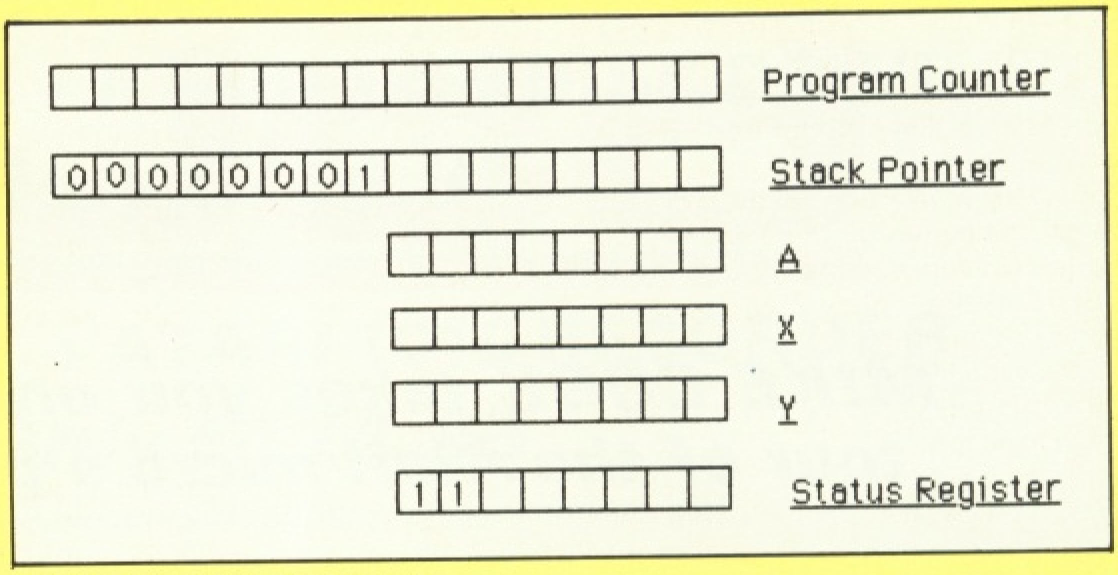


Figure I: The 6502 registers

This can be complicated by the fact that a complete instruction can be stored in one, two or three successive memory locations.

The first part of the instruction contains the information concerning how many other locations are involved. In this way the program counter looks after itself without any intervention from the programmer.

If any data needs to be moved or manipulated then the accumulator is used. There are instructions to move data from a memory location to the accumulator and from the accumulator to memory. Data cannot be moved directly between memory locations.

"If the microprocessor wants to look at a memory location it puts the address onto the address bus"

While data is in the accumulator it can be manipulated. This can mean having a value added, subtracted or having individual bits changed. The instruction set also allows multiplying or dividing by two. All other operations have to be derived from these.

The X and Y registers are known as index registers and are used to point to other memory locations. This means that the program can calculate the memory locations to operate on instead of them being fixed when the program was written. This gives the instruction set most of its power.

The way the address of memory to work with is arrived at is known as the addressing mode. The 6502 has quite a few of these and they are at the root of its power.

The stack pointer is a bit like the program counter, only it points to an area of memory used for temporary storage. It is restrained in that it can only cover 256 memory locations at a fixed address. This register looks after itself most of the time and can usually be left alone.

The status register is different from the rest in that it does not contain numbers as such but a collection of bits. Each bit has its own name and significance.

Whenever any operation takes place the individual bits in the status register change to reflect it. Suppose, for example, we subtract two numbers and the result is zero, then the zero flag (single bit of the register) would be set.

The point is that all the conditional instructions work off this status register. For example, if you want to skip a section of code if two numbers are the same, you would use a "Branch if Equal" instruction which causes a specified number of address

locations to be skipped if the zero flag is set. This then alters the program counter and causes the next instruction to be fetched from further down the program.

The art of using the instruction set to get the computer to do anything is quite involved, and many books have been written concerning machine code programming.

Let's finally look at some of the other features of the 6502 microprocessor.

There are three signal pins on the processor which can interrupt the program currently being executed. With two of these signals the program can recover and continue executing as if nothing had happened. These are known as the interrupt signals.

The simplest unrecoverable interrupt is the reset. Whenever this is triggered the processor will go to a certain address location and look for a number.

This number it will take as the address to start fetching and obeying instructions. This is the restart address.

The reset line is automatically pulsed on power up by the surrounding electronics. As the reset is told *where* to go by a memory location we say the interrupt is vectored.

Two other interrupts are also vectored, the IRQ (interrupt request) and the NMI (non maskable interrupt). The difference is that the NMI is always obeyed whereas the IRQ can be ignored if the processor has executed an instruction to set a certain bit in the status register, the interrupt inhibit flag.

These interrupts on earlier computers were ignored, but they can be made to make the computer appear to be doing many things at the same time.

For example, suppose we want to see if a key has been pressed on the keyboard. We can arrange the program to keep looking at the memory location where the keyboard is located. Alternatively we can arrange for pressing a key to generate an interrupt, and then the program comes to see what key is pressed. Therefore we do not need to waste time looking at the keyboard when no key has been pressed.

The video display can generate interrupts to assist the smooth animation found in so many good games. Also the interrupt can be regularly triggered to keep track of time by implementing a real time clock.

Well that's a brief look at the engine inside your computer, the device that gives it the power. However remember it is the surrounding electronics that make your computer unique and give it the many added features not found on others.

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Micro Scope

No. 1 Reaction Timer

**IN an occasional series we shall be taking a line-by-line look at a short program and finding out how it works.
We kick off with a program which uses the internal clock to time your reactions.**

```
10 DIM G$(20):PRINT "K"
20 PRINT "How fast are your reactions?
":? :? :?
30 PRINT "When a letter appears in the
 centre":? :? "of the screen, press an
y key":? :? "as FAST as you can.":? :?
 :?
40 PRINT "Press any key to start."
50 IF PEEK(764)=255 THEN GOTO 50
60 POKE 764,255
70 POKE 752,1
80 PRINT "K":A=INT(RND(0)*1000+1000)
90 FOR DELAY=1 TO A:NEXT DELAY
100 POKE 764,255
110 POSITION 20,10:PRINT "X"
120 POKE 18,0:POKE 19,0:POKE 20,0
130 IF PEEK(764)=255 THEN GOTO 130
140 TIMER=(PEEK(18)*65536+PEEK(19)*256
+PEEK(20))/60
150 POKE 764,255
160 PRINT "K":POSITION 4,4:PRINT "You
took ";TIMER;" seconds.":? :?
170 PRINT "Another go";:INPUT G$
180 IF G$(1,1)="Y" OR G$(1,1)="y" THEN
 GOTO 40
190 IF G$(1,1)<>"N" AND G$(1,1)<>"n" T
HEN GOTO 170
200 GRAPHICS 0:END
```

10	Dimensions the string G$ and clears the screen.
20-40	Present instructions.
50	Waits for a key-press.
60	Clears out the value of the key pressed.
70	Inhibits the cursor so that it doesn't make the display messy.
80	Clears the screen and pick a random number between 1000 and 2000.
90	Waits for a delay determined by the size of the random number. If you wait for the same amount each time, people can quickly anticipate the onset of the signal and artificially reduce their reaction time.
100	A precautionary clear-out of the key-press location in order to avoid cheating.
110	Prints the signal letter in the middle of the screen.
120	Sets the clock to zero.
130	Waits for a key-press.
140	Looks at the clock locations and calculates the elapsed time.
150	Clears out the key-press again.
160	Clears the screen and gives the reaction time.
170-190	Offer another go. Assume that if the reply starts with the letter Y (upper or lower case) then the answer is "yes", and if it starts with an N (upper or lower case) the answer is "no". If it starts with anything else, ask the question again.
200	Exits politely.

What makes a micro get on its bike...

AFTER my micro has been sitting undisturbed for some time, why does my television begin cycling through a series of colours? – **Steve Temple, New Eltham, London.**

● This cycling through a series of colours is called the "attract mode". This term is a left-over from the coin-operated games where it was primarily used to attract customers.

Atari incorporated this feature, not to attract, but rather to protect the television screen from being permanently "burned" by any bright stationary image, which could only happen after many hours of displaying an image.

Atari decided to ensure your screen would be protected by including this feature in the design.

Thus, if you do not press a key for approximately nine minutes (even if you are using other inputs, for example joysticks), your system will automatically initiate the attract mode and your screen will begin cycling through a series of colours.

This will not occur with Atari programs that only utilise input from the joystick or paddle controllers. These have been designed to go into the attract mode only if there is no joystick or paddle activity within the nine minutes.

Cleaning up the heads

DO I need to clean the heads of my disc drive? If so, how do I do it? – **P. Jones, Bedford.**

● The heads of your Atari disc drive can be damaged by some disc head cleaning kits. We advise owners of these disc drives not to use any head cleaning discs.

Clean the head much as you would the head of a tape deck. Gently wipe the head with a bit of cotton, soaked in denatured alcohol.

Let it dry for 30 minutes before using the drive.

Unattractive attract

IF I have designed my own game, how can I eliminate the annoyance of the attract mode when I am only inputting into the system via the joystick or paddle controllers? – **Quentin Brooks, Desborough, Northants.**

● All you need to do is periodically reset the attract mode clock so that it never reaches the end of its nine-minute count. To do this, simply add a line with POKE 77,0 at various points in your programs.

Since this feature is an important one, you should not eliminate the attract mode entirely. Instead, you should include a routine in your program like the following pair of lines to determine if a joystick has been used recently.

These two lines should be included at various points in your program.

```
100 IF STICK(0) = 15 THEN 100
110 POKE 77,0
```

The first line checks to see if the joystick is in the upright position (in other words, unmoved). If it is, the program will remain on this line and, after nine minutes, the attract mode will begin and thus protect your television screen.

If you have moved the joystick, the program will continue automatically to the next line. This line resets the counter so the attract mode will not begin for another nine minutes.

Random selection

I READ somewhere that the argument to the random function can be anything – it's a "dummy" argument. If this is the case, why does everyone use RND(0)? – **Shaun Williams, Canterbury, Kent.**

● You're right, the argument is a dummy so you could have RND(99) or even RND(BLOB). Using a zero is purely conventional, but it does have the advantage that it's quick to type, being on the same key as the right-bracket that you need to contain the argument.

It doesn't blind you

MY mother keeps telling me that I'm getting too close to the television screen. She says that it will make me go blind. Is this true? – **Kevin Black, Orpington.**

● Only if you keep banging your head on the screen, Kevin. To be serious, you shouldn't get too near as you could suffer eyestrain. Of course, the knob on the side of your TV can be used to control brightness. As with everything, moderation is to be recommended.

Testing, testing

I'M a bit confused about my 800XL's self test programs.

When I type BYE and put the memory test on, only 40 little green boxes appear under the word RAM. But the handbook says I should see 48.

Does this mean that some of my RAM is no good, and should I take my micro back to the shop where I bought it? – **Jim Cannell, Prescot, Merseyside.**

● Your RAM probably isn't bad because if you type BYE you are already using some of it – the "missing" eight blocks are taken up by the Basic language which is built in to your 800XL.

To see the full 48 blocks tested, use the other method which the manual gives by turning your micro on while holding down the Option key. This will produce 48 green blocks – unless some of the RAM really is bad, in which case the block will be red.

If this is the case, you should take the micro back to the shop where you bought it.

User group hints

I THOUGHT your readers might be interested in a few little tips I picked up recently at the local user group.

The clicking sound from the

→

ATARI USER Mailbag

WE welcome letters from readers – about your experiences using the Atari micros, about tips you would like to pass on to other users . . . and about what you would like to see in future issues.

The address to write to is:

Mailbag Editor
Atari User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY

TV each time you press a key can be suppressed with:

POKE 731,255

You can turn it back on again with:

POKE 731,0

To activate the international character set use:

POKE 756,204

To see the set displayed on screen, hold down Control as you press each key. To turn it off and return to normal use:

POKE 756,224

To slow down the rate at which the text screen scrolls, type in:

POKE 622,255:GR.0

To turn it to normal, use:

POKE 622,0

You can alter the speed at which the cursor auto repeats as follows:

POKE 730,1 Super fast
POKE 730,3 Fast
POKE 730,5 Normal

I hope your readers can find some use for these. – **David Eckersley, Tadley, Hants.**

Curses, no flashing cursor

I AM a BBC Micro owner but my son has an Atari and I quite often dabble on his machine. I am used to having a flashing cursor on the screen so I came up with this routine to put one on the Atari.

I've had a good look round and this machine seems to be the only one without. – **P. Jones, Bradford, Yorks.**

● Thanks for your offering. When testing it we also noticed that any inverse video characters also blinked away quite merrily, which should give readers a hint about what you're doing.

If you want to make this into a subroutine, don't forget to change the END in line 30030 to RETURN.

```
30000 Y=0:I=0:RESTORE 30050
30010 READ X:Y=Y+X
30015 IF X=-1 THEN GOTO 30030
30020 POKE 1536+I,X:I=I+1:GOTO 30010
30030 IF Y=8959 THEN A=USR(1536):END
30040 ? "BAD DATA":END
30050 DATA 104,162,6,160,0,132,205,160
,19,169,8,133,206,169,7,32,92,228,96,7
2,138,72,165,206,240,39,230,205
30060 DATA 165,205,197,206,208,25,169,
0,133,205,165,204,208,10,169,2,141,243
,2,133,204,76,59,6,169,0,141,243
30070 DATA 2,133,204,104,170,104,76,98
,228,169,2,141,243,2,76,59,6,-1
```

Instant eradication

I WAS delighted to hear about the forthcoming magazine and wish you well. I decided to try and be one of the first people to write to you, but news spreads fast so perhaps I am being a little ambitious.

I thought you might be interested in this little routine I wrote to enable unwanted lines to be deleted from a program.

The lack of a DELETE command on the Atari is a bit of a pain, and I've found this program (below) very useful.

All you do is attach it to the end of your listing by loading it in from cassette or disc, and then enter GOTO 32000.

You'll obviously have to increase the line numbers if they are not higher than those of your program.

Type in the first and last line numbers that you want deleting and the program does the rest – instant eradication.

You can, of course, use it to delete itself once you have finished but the last two lines will have to be removed manually. – **George Pickering, Long Eaton, Notts.**

```
32000 GRAPHICS 0
32010 ? CHR$(125):? "ENTER FIRST LINE"
;:INPUT FIRST
32020 ? "ENTER LAST LINE";:INPUT LAST
32030 FOR LINE=FIRST TO LAST:? CHR$(12
5):POSITION 2,6:PRINT LINE
32040 POSITION 0,0:POKE 842,13:POSITIO
N 2,7:PRINT "CONT":POSITION 2,4:STOP
32050 POKE 842,12:NEXT LINE:GOTO 32000
```

Breaking a bad habit

CONGRATULATIONS on the new magazine – I heard about it at the User Group. Can I be your first letter? I've got a problem that I didn't like to admit to the whizz kids at the group.

I'm a newcomer to computing and am having difficulty with the keyboard. Not being a typist, I wanted to do a bit better than the usual two-finger job so I've been trying to touch-type properly.

The trouble is I keep hitting the Break key by mistake when I mean to hit Return. Why do they put it (the Break key) so close to the other keys? It would have been much better away from everything else, wouldn't it?

Is it worth me making a cover for the Break key to stop me hitting it, or does someone sell one already? – **John Cavanagh, Swinton, Manchester.**

● Sorry, you can't be our first letter – the grapevine is obviously very efficient in these parts.

Your problem will be solved once you've learned to touch-type, so keep practising. In the meantime, the following routine incorporated into your programs will disable the Break key so that its accidental use won't jump you out.

```
10 X=PEEK(16)
20 IF PEEK(16)<128 THEN
   50
30 POKE 16,X-128
40 POKE 53774,X-128
50 REM Start program
   here
```

You can still use the Reset key to jump out of a program, but you're not likely to hit that one accidentally.

If your program changes graphics mode or writes to a disc drive or printer you'll need to execute this routine again in order for the Break key to stay disabled.

If you *do* need to execute it several times, use the Gosub . . . Return command to save repeating the lines.

As far as we know, nobody markets a cover for the Break key – if you move quickly you could corner the market!

Noisy messages

HERE'S a little program that prints out your messages one letter at a time in Mode 0,1 or 2.

The printing is also accompanied by some weird noises.

It isn't anything sparkling but the routine might come in useful for someone.

```
10 DIM A$(15)
20 GRAPHICS 1
30 A$="ATARI RULES O.K"
40 FOR I=1 TO 15:? #6;
   A$(I,I);
50 S=PEEK(53770)
60 SOUND 0,5,10,14
70 FOR DELAY=1 TO 100:
   NEXT DELAY
80 NEXT I
```

– **James Ryder (14), Liss, Hants.**

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It finally happened. Despite saying that I'd never get addicted to adventure games, there I was at two in the morning, staring bleakly at the screen. "What now?" on my television screen. Just how on earth do you get past that hostile woolly mammoth?

The game in question was *Lords of Time* from Level 9 and yes, I was hooked. I didn't need any second telling, therefore, when I was given the chance to meet the creators of the Time Lords, woolly mammoth and all, at their hideout in High Wycombe.

Ask any dedicated adventure player to name a software house, and it's quite likely that the answer will be Level 9. Not only do they produce a range of consistently high class...

If anyone asked me to recommend a first adventure game to try, I don't think there would be any hesitation in my reply. The obvious choice is Colossal Adventure from Level 9.

In the first place, Colossal Adventure is the original. Scott Adams may have been the first programmer to fit an Adventure onto a microcomputer (the TRS-80), but his inspiration and the start of the genre was a piece of software written by Americans Crowther and Woods on a mainframe computer back in 1978. In those days memory was scarce and very expensive, so Adam's feat was hailed as nothing short of miraculous. Nevertheless, in my book he stands in Pete Austin's shade.

Pete Austin, Level 9's head Guru, has done wonderful things with text compression - a technique for packing English text...

...former best... Terry Jones. It also features graphics, and is extremely challenging, and up to the best standards of Level 9, who wrote it for Mosaic.

Return to Eden (A, At, B, C, M, S, £9.95) is Level 9's follow-up to their extremely successful Snowball adventure, and the second part of the Silicon Dream trilogy.

Popular

It also includes graphics, and is full of the frustration problems which are Level 9's...

...the computer. Be warned, Dungeon Adventure certainly gets ten out of ten for addictive quality!

Level 9 produce games that are usually large...

...become a... affinity between a good fantasy and adventure game ... ability to draw the adventurer into the ... ate world. For this reason ... only adventure succeeds most ... of Level 9's offerings are a trea... added boon they are each available... good range of the popular micr... most civilised.

As an adventure fan, I viewed the prospect of reviewing the latest Level 9 game with excitement. This particular game marks something of a landmark since it's the first Level 9 adventure with graphics and, much to my surprise, the game doesn't suffer adversely. Granted the location descriptions are shorter than before...

Pick of the week

Hard core adventure fans and all persons of taste and discernment...

BEST TEXT-ONLY ADVENTURE

SNOWBALL
by LEVEL 9 COMPUTING

Problems and puzzles abound; this is a world unknown to humans and many plants or creatures have odd properties. Just trying to survive ten minutes is difficult — Level 9 keep rolling those heavy dice on you but give you a few resurrections before finishing you off.

Exhausted compulsives of the firm's other works may just as well admit to themselves now that they probably won't be sleeping much the next few months. At...

...adventures still represent a large chunk of the ... Level 9 one of the most respected (although ... turned to graphics with their latest release ... hands down, with ...

...Eden, another brain scrambling adventure from Level 9 and sequel to **Snowball**. The presentation has changed — the game includes location graphics, yellow word display on a black background and... 'ahead'. That feature...

The appearance of a new program from Level 9 is a flag-day for all aspiring adventures and, in my household, a signal for the cat to hide under the bed for the duration against the inevitable moment when I go rampaging through the flat, a wild look in my eyes, muttering ferociously about bricklaying birds, nudist beaches and the like. Since *Return to Eden*, the sequel to *Snowball* is out, the cat may be...

A new title from Level 9 is always reckoned to be an Event, and Pete Austin groupies won't find anything to disappoint them in Return to Eden – which also...

The game is full of tricky puzzles, some horrendously devious. You gain points for solving the adventure, not for collecting treasure.

The illustrations are drawn in multicolour mode and while relatively simple, are well designed and do enhance play. Best of all, they're drawn quickly. The game is accompanied by a very good instruction manual and the usual envelope for a free hint.

Overall, excellent value which, in my view, is unsurpassed by any other software house in this country. Buy it and enjoy. A.W.

Level 9 make no secret of their own 'a code' used to devise Snowball and boast an ever-increasing library of compression techniques used to instigate the likes of Return to Eden. These games are the length you might expect and a well-written game and addition, user-friendly, intelligent and imaginative, with good descriptions producing a rich atmosphere...

...for every computer, Pete Austin is ... 9's other games. In fact, in adapting his ... so prolific ... other machines, ... that I fully expect them to be available on washing machines soon! It's fully up to Level 9 standard. Briefly, that's praise indeed.

...you are on the ... all goes well. The game starts with you awoken from cryogenic... Obviously something is ... you have escaped from ... avoided the now homicidal ... must endeavour to switch back to autopilot, as som... aimed the ship at a star. This adventure is devious i... Level 9 are to be congratul... writing such an excellent ad... secondly for including a "He... envelope. If you are real...

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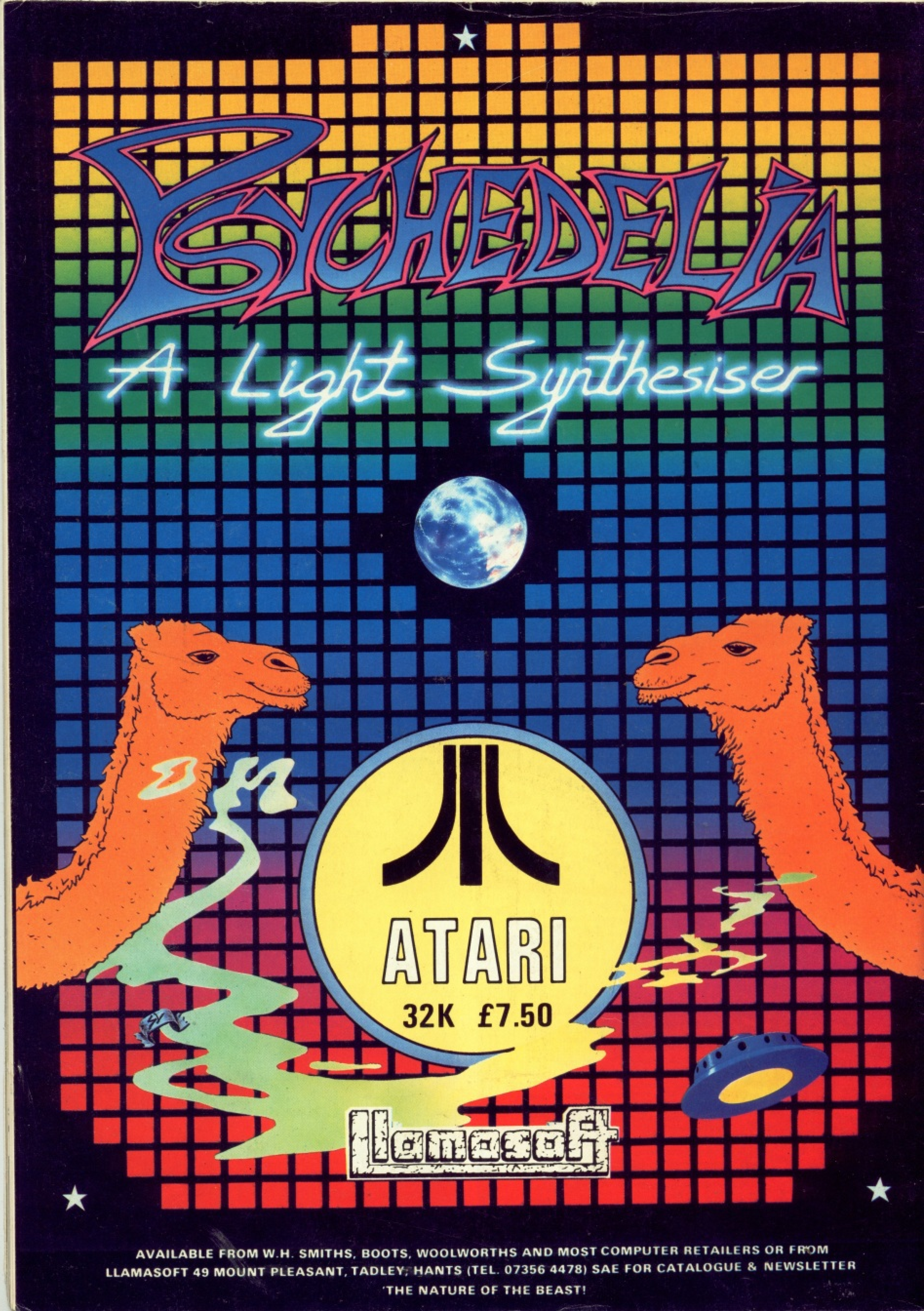
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